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PARASITOLOGY IN DIVERSE PHASES.

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IF a short space in the next issue of the *Journal* can be spared the following cases are, I think, of sufficient interest to be placed on record. They will be given as concisely as possible, because the time at my disposal is limited.

Each case will come under the heading of Parasitology, and, in passing, I should like to remark what a great boon a good reference book on this subject would be, both to the student and the practitioner of veterinary medicine. Our present literature leads an enquirer into a regular maze.

Case I.—Nearly thorough-bred chestnut filly, foaled in April, 1889, her dam being *then* four years old, and, therefore, only *three* when she was put to the horse. I lay stress on this, as it is one of many cases I am reserving to demonstrate the thesis I promulgated in a former issue of the *Journal* (April, 1889), of the reckless folly of breeding from *immature* parents; and that this may be a cause of the whole category of what we are pleased to term hereditary unsoundnesses.

There were two other older mares and their foals, the three foals being about the same age, and all the mares and foals were running together in the same field, which was a badly-drained clayey park, near the New Forest. The two foals of the older mares were always healthy, and have developed into strong and vigorous animals.

The filly under consideration was foaled on the 9th of April, and, for the first three weeks of her life, gave every promise of making an unusually fine mare. On the 30th April she was noticed to be suffering from diarrhœa, and as this continued

for some days, I was asked to see her on the 6th May. Corrective medicines were given, in the first place to the dam; and this proving ineffective, they were administered to the foal direct. A change of pasture was advised, but this was not convenient for the owner at the time of the year.

The diarrhœa continued with more or less virulency all through the summer, antacids and astringents being alike powerless to check it.

The filly was becoming quite emaciated, and was brought to my infirmary, on October 9th, after she was weaned. My idea was that possibly a change of water, food, and soil might effect an improvement.

I now watched very closely for "worms," but for some time could detect no trace of them. I made a careful daily examination of nearly all the fæces that she passed. When she was having Ferri Sulph., and, later on, Cupri-Sulph. and Opium, small *bunches* of thread-worms were found occasionally; on some particular days there would be numbers of them, and then none would be seen for days and weeks.

The filly was kept dry and warm in a large, airy, loose box, and, when she would take it, she was fed liberally. A lump of chalk was kept in her manger, which she would *eat* at times with a relish; she did not care much for rock salt, which was also left within reach.

Her appetite was capricious; it was always best when the diarrhœa was the worst; when, by a regular personal administration of astringents in the form of bolus, the purging was checked, then would she cease feeding; and so the case went on until the beginning of December, when she became so weak and emaciated that she could scarcely rise without assistance.

The owner prized the filly very much, and was loath to give his sanction for her to be destroyed; eventually he acquiesced to my solicitations, and an end was put to her sufferings on the morning of 25th December. I chose this day because I hoped to have an opportunity of spending my holiday in a manner most in harmony with my idea of pleasure, viz., in making a careful *post mortem* examination of what I felt sure would be an interesting case.

Autopsy.—The fluid in the abdominal cavity was slightly in excess of normal.

Large patches of effusion, irregular in outline, were very noticeable under the peritoneal serous membrane; in the centre of each of these was a bright-red strongle, curled on itself, with its flattened and opened oval extremity embedded

in the muscular tissue, and the sharp-pointed caudal extremity coiled round in a spiral manner.

The cutting apparatus of the mouth in a specimen I have been lately examining, has much the appearance of a *Trephine;* and it is *retracted.*

These nematodes—which appear to be identical with Cobbold's *Trichonema arcuata*, except that they are larger—were plentiful under the abdominal serous membrane. I also found extensive blood extravasations, but no parasites, in the inter-muscular connective tissue, more especially in the region of the quarters, and one large extravasation was found on the neurilemma of the great sciatic nerve, at the point where it rests on the ischiatic ligament.

When I proceeded to disembowel the filly, the great mesenteric artery had the appearance of being enveloped in a scirrhous mass, and I began to imagine that I was, after all, dealing with a case of tuberculosis. This portion was, therefore, removed very carefully.

There were several nematodes *in* the mesenteric artery (I should say the same as those encysted, as before mentioned, only in a more advanced stage of development). I do not think they are the *Strongylus armatus* of Cobbold.

The calibre of this artery was normal, and the coats of their natural thickness; *but the coats of each of the branches of the artery rising from it were very much thickened, quite indurated, and each of these arteries was almost, if not entirely, occluded; and in these arteries, and in their coats, the nematodes were encysted in numbers—giving the whole, as I have before mentioned, the appearance and feel of a dense scirrhous mass.*

The specimen was placed in glycerine, and is still in my possession in good preservation.

This, then, had been the cause of the wasting and the diarrhœa—the interception of the blood-supply to the intestinal canal, and possible interference with the function of the nerves emanating from the Solar plexus—and the consequent non-assimilation of food.

There were no parasites in the intestinal canal, other than those encysted in the walls of the intestines.

There were a few *Filariæ in the bronchial tubes*, and to these I must give the old name *Filaria Bronchialis*. I think it is better than *S. Filaria* or *S. rufescens*, because the old name conveys an idea of the character of the parasite, and of the locality in which it may be found. The filly never coughed, and the presence of this parasite was not suspected during life.

The question presents itself: why was it this filly *only* was attacked, when the two other foals, exposed to exactly the same environments, escaped? For it must be remembered that they were all running together throughout the summer, from April to October. May we not assign as a reason, that it was due to an inherent incapacity to resist the parasitic attack? And was not this induced by her being begotten by parents themselves immature, and thus incapable of endowing the embryonic germ of the future horse with the elements of maturity? This is the only satisfactory solution I can give to the problem.

Case II.—May 11th, 1888.—A three-years old cart filly was brought to me suffering from an extremely painful swelling on the withers. The whole region of the withers and shoulder was swollen to an enormous size; the lymphatics round the part were hard and corded, and the whole was so intensely painful that she could not bear it to be touched.

I ascertained that the filly had been purchased at one of the Autumn Fairs, and that she had been turned out for the winter. She had been taken up a fortnight before I saw her, and had, during this time, been broken to harness.

She was quite well until the 10th, the day before I saw her, when she was dull and "off her feed"; but the wither was not noticed to be swollen until the morning of the 11th.

The whole surface of the inflamed area was carefully manipulated, as, with such a history, one would expect to find some foreign body.

At a point corresponding to the antero-superior edge of the scapula, there was a slight softening, and on close examination there was a small orifice discernible; this was enlarged, and I extracted a larva of the Œstrus bovis!

The wound was dressed with an antiseptic lotion, warm fomentations were applied to the inflamed parts, and in a few days the mare was quite well again.

The interesting and instructive feature of this case is that, at this time of the year (May), when these larvæ in their normal hosts begin to grow rapidly, they must introduce a poisonous material into the circulation of the bearer, which induces an inflammatory action in the blood, and this supplies them with nourishment. The inflammation is not very perceptible in the ox, but when the same poison is introduced into the circulation of the horse (an abnormal host), this case illustrates that it may be followed by serious constitutional and local disturbance.

Case III.—February 6th of this year, while I was attending some cattle on a farm near the coast, my attention was drawn to the backs of some heifers, which were covered with round purulent sores, each about the size of a shilling.

At first sight, seeing several affected, and the same *round* sore being characteristic in each case, it struck me as being due to some specific eruption.

It must be borne in mind that the time was just after the long continuance of severe frosts.

They were closely examined, and I was satisfied that the poor starving rooks and starlings had been digging into the cysts of the Œstrus bovis to extract the larvæ.

The application of anodyne ointment was followed by quick recoveries.

EXPERIMENTS WITH MALLEIN OR GLANDER LYMPH.

BY E. E. BENNETT, F.R.C.V.S., A.V.D.

THE paper by Dr. Pearson, which appeared in the VETERINARY JOURNAL for November, is so interesting and important, that I am led to enlarge upon the subject, and to give the most up to date details of the experiments that have recently been carried out in Germany, and the conclusions, which have been arrived at by several investigators.

Koch's discovery of Tuberculin, and the specific reaction which it calls forth in tuberculous individuals, has opened up a new field of enquiry as to the treatment, diagnosis and prevention of infectious diseases generally; and however much the study may still be said to be in its infancy, yet there can be no doubt, that in time, when the systems of culture and inoculation are perfected, this method will have a great practical importance in medicine. In the diagnosis of disease (the side of the question with which we are chiefly concerned at present), and more particularly in those diseases which, in their early and chronic stages, are sometimes most difficult of discernment, it will be of the utmost value in enabling a decision to be arrived at, and so doing away in a measure with the danger which may result from keeping animals for a length of time under observation.

Tuberculosis and Glanders are maladies which may both be classed as difficult to diagnose in their early inception, and even in chronic cases the *intra vitam* appearances may be so little noticeable, that we fail either to appreciate the

gravity of the situation, or are unable to undertake the responsibility of a condemnatory decision.

Various methods for the diagnosis of glanders have from time to time been advocated, but they one and all are too tedious in operation, or too uncertain in result to be of any real practical value; some of these systems may be mentioned, *e.g.*, the inoculation of susceptible animals from such as are suspected; cohabitation; extirpation of glander and farcy nodules; destruction of farcy buds by the actual cautery; the artificial generation of fever to hasten on the diseased processes; the cultivation of the glanders bacillus, &c. &c. What we require in practice is a means which, being rapid, is also certain in its effects, and one which leads to no untoward results; following up, therefore, the discovery of tuberculin and the specific reaction which its inoculation calls forth in tuberculous subjects. Kalming, of Riga (since dead of glanders) and Hellman, of Dorpat, busied themselves in the production of a fluid which should produce a typical reaction in glandered animals. This material was manufactured (with slight deviations according to the dictates and experience of the experimenters) from potato cultures of the glander bacillus as follows: 5 grs. of the culture were thinned with 20 c.c.m. of sterilised water, and the mixture stood for 20 minutes in a Thermostat at 120°C., four times repeated during 24 hours, and the emulsion then obtained was further heated for 48 hours at a temperature of 39°C., and then with the help of an air pump passed through "Pasteur's filter." As a result, there was obtained about 12 c.c.m. of a light yellow fluid, which was yet again heated to 120°C. for 15 minutes, this oft repeated heating being to insure the thorough destruction of the glanders bacillus. I must here point out that the glanders bacillus behaves in a *specific* manner when cultivated on the potato, changing the colour of the culture ground from green to brown, and finally to black; no other known organism possesses a similar peculiarity when so prepared. The early experiments with mallein were carried out through the agency of guinea pigs, and the results obtained were very similar to those related by Dr. Pearson, viz., artificially glandered guinea pigs were injected with carbolised glander lymph, and in each case such injection called forth a reaction, whereas in the control experiments on healthy guinea pigs, little or no rise in temperature was noted after inoculation. This success was followed up on the first opportunity by the inoculation of horses in a glandered stud, with a view of testing its efficacy as a means of diagnosis. The chance offered early

in June last, where out of a stud of 11 farm horses, 5 had been destroyed as suffering from the disease, all of which on post-mortem examination showed manifest signs of glanders; the remaining 6 were, in consequence, ordered by the police authorities to be killed, but previous to this order being carried into effect, they were inoculated with mallein, the following being a short *resumé* of the experiment:—

(1.) Brown gelding, 4 years, poor condition, short cough otherwise appearance healthy.

(2.) Chestnut mare, 9 years, fair condition, short sharp cough.

(3.) Chestnut mare, 8 years, low condition, soft cough.

(4.) Chestnut mare, 15 years, weeping from left eye.

(5.) Brown mare, 1¼ years, in good condition.

(6.) Foal, 14 days, in good condition.

Nos. 1, 2, 3, 4, were injected with 0·3 c.c.m. of g. lymph.

No. 5, with 0·2 c.c.m. g. lymph.

No. 6, with 0·1 c.c.m. g. lymph.

The inoculations were made under the skin of the throat or shoulder, with a sterilised syringe.

The following chart shows state of temperature and pulse after injection.

June 10th, 1891.	1	2	3	4	5	6
	0·3 c.c.m.	0·3 c.c.m.	0·3 c.c.m.	0·3 c.c.m.	0·2 c.c.m.	0·1 c.c.m.
1st injection—	Temp. P.	Temp. P.	Temp. P.	Temp. P.	Temp. P.	Temp. P.
2 p.m.	38·4°C.	38·5°C.	38·2°C.	38·2°C.	38·4°C.	38·4°C.
5 p.m.	38·3,48	38·0,44	38·2,54	37·9,50	38·4,44	38·4
7 p.m.	38·2,52	38·3,48	38·7,56	38·3,50	38·4,54	38·8
2nd injection—	0·3 c.c.m.	0·5 c.c.m.	0·5 c.c.m.	0·5 c.c.m.	0·3 c.c.m.	0·3 c.c.m.
9 p.m.	38·0,44	38·3,52	38·8,58	38·3,48	39·4,52	38·9
11th June, 5 a.m.	40·1,60	39·8,54	40·4,64	39·4,56	49·1,48	38·6
7.30 a.m.	40·4,60	39·6,56	39·0,60	39·7,58	39·1,54	38·4
9.30 a.m.	39.8,60	39·6,48	39·6,60	39·5,56	39·3,48	38·0

Soon after the inoculation, a somewhat flat doughy swelling appeared at the point of injection in all the horses, with the exception of the foal (No. 6).

As the Table shows, the temperature was highest in Nos. 1, 2, 3, 4 and 5, some 15 hours after the first, and some 8 hours after the second injection. In No. 1, the thermometer registered a total rise of 2°C., in No. 3, as much as 2·2°C., and in the remainder from 1·5°C. to 1·9°C. In the

foal the temperature was only slightly elevated after the first, and on the contrary, fell after the second injection. None of the animals refused their food, although the first five were manifestly drowsy, and disinclined to move after inoculation. On June 11th, the orders for destruction were carried into effect, and a post-mortem examination was made in each case, and all with the exception of the foal (No. 6) were found to be glandered, typical lesions—both old and new—being brought to light.

As a control experiment, a mare condemned to be destroyed, as being useless for work, owing to the result of an accident, was inoculated with the same g. lymph as used in the other cases, and although as much as 1·8 c.c.m. was injected, no reaction occurred, nor was its general health in the least disturbed.

Since the foregoing, two other distinct sets of experiments have been undertaken by separate investigators, to test the efficacy claimed for the glander lymph as employed by Herr Preusse.

So lately as September last, Schilling, V.S., of Oppeln, carried out a series of inoculations in the remnant of a stud of 25 horses, 16 of which had been destroyed, and were proved on post-mortem, to be suffering from glanders. The remaining 9, although carefully examined, appeared to be quite healthy; they were inoculated in a similar manner to that previously described, with 1·0 c.c.m. glander lymph, prepared by Herr Preusse himself, and diluted before injection with $\frac{1}{10}$th part 1% carbolic solution; the first injection was made at 1 p.m., the second at 9.30 p.m. the same day.

TABLE SHOWING DETAILS OF EXPERIMENTS.

No.	Description.	Before infection. T.	P.	R.	After 1st. infection. T.	P.	R.	After 2nd. infection. Temp.	Result on P.M. examination.
1	Ch. M. 7 yrs.	38·1	40	12	38·7	45	12	38·8	Glandered.
2	Bn. G. 7 yrs.	38·0	42	12	38·0	42	12	38·0	Healthy.
3	Bn. G. 7 yrs.	37·6	36	16	38·5	40	15	—	Glandered.
4	Bn. M. 12 yrs.	38·8	50	25	40·5	60	30	39·8	Do.
5	Bn. G. 7 yrs.	38·3	45	16	38·8	48	14	38·8	Do.
6	Bn. G. 8 yrs.	38·2	40	14	38·1	40	12	37·7	Healthy.
7	Ch. G. 7 yrs.	38·2	40	12	38·4	40	12	37·8	Do.
8	Bn. M. 7 yrs.	38·4	42	14	37·7	45	12	37·7	Do.
9	Bn. M. 7 yrs.	38·4	42	12	38·4	45	12	37·0	Do.

The first rise in temperature took place 8½ hours after the first inoculation, in four of the horses, viz., Nos. 1, 3, 4 and 5. In three of the horses, the rise was only some tenths of a degree centimetre, during the same time that No 4 rose from 38·8°C. to 40·5°C.

In only one horse, No. 1, was there a further rise of temperature 8 hours after the second injection, and in no case was there acceleration of the pulse and respiration after the second injection.

The general appearance of the horses was not materially altered, except Nos. 3 and 4, which were for a short time off their feed and drowsy. The 9 horses experimented on were all shot at 8 a.m. the day following the injections, and examined by two independent Veterinary Surgeons, with the result that Nos. 1, 3, 4 and 5 were found to be glandered, whereas the others showed no suspicious signs of the disease whatever.

According to the table, it was proved that those horses which 8 hours after injection (except in No. 7, which varied only ·2°C., had an increased temperature—*reaction*, were glandered, and that in two of these there was again an increase eight hours after the second injection, and, further, that in the 5 horses in which little or no increase occurred after the first and second injections, there was not the least sign of glanders on P.M. examination.

In the case of the second series of experiments made by Peters and Felisch, I have unfortunately mislaid the details, but the general conclusions which they were enabled to arrive at, were as follows, viz :—

(1.) That Preusse's lymph when injected into glandered horses, calls forth a *specific* reaction, which specially shows itself by an increase in temperature, and that this reaction does not (* as a rule) take place in healthy animals.

(2.) That the temperature elevation is not influenced by the severity of the already existing disease, that is to say, the *reaction* is sometimes greater in those animals which appear to be suffering only slightly from glanders, than in those more seriously affected.

(3.) The reaction sets in 8 to 10 hours after inoculation.

Granting that the outcome of the experiments hereinbefore mentioned is as accurate as we are led to suppose, by those who have undertaken the original researches in this direction,

* In one case inoculated, a reaction took place, although the animal on P.M. was found free from glanders, but it may have been due to some constitutional disturbance, which passed unrecognised at time of injection.

it is needless to remind the reader that the rapidity with which glanders could be identified, would be of inestimable service to the practitioner who has the responsible charge of large studs of animals, and who constantly has to be on the alert in interpreting any suspicious symptoms of this grave and incurable malady.

SURRA IN HORSES.

BY G. RANKING, M.D., CANTAB., SURGEON-MAJOR 5TH BENGAL CAVALRY, LUCKNOW, INDIA.

IT was considerate of Mr. Gunn to warn his *confrères* against the pitfalls yawning before their feet, should they venture to follow me along the path of research which I had indicated as the likeliest to lead to a result in the investigation of Surra. No doubt his warning will be heeded by those whose habit it is *jurare in verba magistri;* others will take the facts and form their own opinions.

The criticism of my work might, however, have been conceived in a more liberal spirit, and couched in more complimentary language; but this is hardly to be wondered at, as Mr. Gunn has evidently missed the point of the research. This was undertaken with no preconceived idea of the pathology of Surra, with the exception of a knowledge of the results obtained in this field by previous workers, and a wish to confirm or check these results by my own observations. Into these I need not here go in any detail. Although Mr. Gunn appears to doubt the fact, I may repeat that, according to the result of the examination of hundreds of specimens of "Surra" blood, the Hæmatomonus Evansi was not only not "invariably present" in "Surra," but was found in a perfectly healthy mule—tolerably clear evidence against its being pathogenic.

Further, Mr. Gunn objects that my "scientific deductions have been disproved by my own showing." I have not by me the number of the VETERINARY JOURNAL from which he quotes, but a reference to the original pamphlet which was republished in that Journal, shows me:—

(1.) That frogs when inoculated were infected, and the organism reproduced from their blood.

(2.) Rabbits inoculated were also infected, and the organism was reproduced from their blood.

(3.) Pigeons showed themselves to be immune.

So that Mr. Gunn's objection falls to the ground. If he means that I did not attempt to reproduce the disease in *horses* or *mules* by inoculation, that is so; but horses and mules are too valuable, *fiat experimentum in corpore vili.* The cheap rodent and the inexpensive batrachian answer every purpose.

But Mr. Gunn may also bear in mind the old adage, "The proof of the pudding is in the eating." If Mr. Gunn were in Lucknow, I could show him one of our troop horses, once reduced to a bag of bones from "Surra," given up as hopeless by the veterinary surgeon in attendance, and about to be shot, now well, in good condition, and able to work.

This horse was treated upon lines indicated by the results of the research which Mr. Gunn is good enough to stigmatise as having been made "to correspond with a theory." Vulgarly this might be termed a "bogus" research.

For the present I leave the subject as it stands, content to know that whether I am right, or whether I am wrong, the truth will inevitably be arrived at by those who will be at the pains to repeat my observations.

Editorial.

AN UNPATRIOTIC SPECULATION.

THE enterprise of speculators is well know, and may be said to have no limits. But who could ever have imagined that a roaring race-horse would have afforded a subject for a syndicate to operate upon, and on a large scale too. A lengthy correspondence has recently appeared in the newspapers, with reference to a very celebrated horse which had been expatriated because of this infirmity a few years ago, and which speculators are now anxious to bring back to this country, to *improve* the breed of horses. Ormonde—one of the grandest horses that ever appeared on the English turf—the property of the Duke of Westminster, became affected with laryngeal hemiplegia in the autumn of 1886, when he was three years old. He was trained late as a two-year-old, and ran only three times in the autumn of 1885. He won all his races in a brilliant manner, but as the disease gradually increased in intensity, and as his noble owner did not wish to risk the animal's reputation, it was decided to withdraw him from a racing career, and send him out of the country. His Grace's patriotic motive every lover of horses must applaud. "I felt certain," he says, "that the horse would be in great demand as a sire here, and I had no wish to be the means of adding to the increase of a disease which affects far too many of our horses in this country." The horse was therefore sold for £12,000, and went to Buenos Ayres, where he was put to the stud. It is now proposed to buy him for £35,000, bring him here, and sell his services at a very high figure. Most fortunately, the scheme has been made public, and there is reason to hope that the *exposé* made by the Minister of Agriculture, and the Dukes of Westminster and Portland will have the effect of checking the speculation which, if it succeeds, can have nothing but bad results. For if there is a disease above all others that has been again and again demonstrated to be hereditary, it is this so-called Roaring. The records of the Continental Government breeding-studs, in which the progeny of horses can be traced through many generations, afford absolutely conclusive evidence of this; and the history of our own thorough-bred horses also testifies to its reality. Even the history of the

family of the horse in question offers unmistakeable proof. His dam, Lily Agnes, in whose predecessor, there was a roaring taint, became affected before she left the turf; his own brother, Ossory, foaled in 1885, became a roarer; and his sister, Fleur de Lys, foaled a year later, has gone the same way. His Grace has had these two also banished from the country, in order to prevent their damaging the high-class horses we possess.

What makes this occurrence more notable to the Veterinary profession, is the fact that the spokesman of the syndicate, in his endeavour to allay apprehension of danger from Ormonde being allowed to propagate his species in England, has stated that high Veterinary authorities are of opinion that this most serious defect is not hereditary. It is to be hoped that such a statement has no foundation ; for with the overwhelming evidence existing to the contrary, such persons certainly incur a grave responsibility, and they would certainly not receive the support or countenance of any members of the profession we are acquainted with. We admit that some of the affections which are stated by some members to be hereditary, are very doubtfully so, and in all probability are not. But about Roaring there should be no question; and it would certainly tend to render ineffective the measures that are not adopted to get rid of it, did Veterinary Surgeons throw any doubt as to the soundness of the conclusions arrived at by those who have had the best opportunities for studying its propagation, and its baneful effects on the equine population of the United Kingdom.

CONTAGIOUS PLEURO-PNEUMONIA IN AUSTRALIA.

Mons. Loir, the head of the Pasteur Institute in Australia, who is carrying on investigations with a view to discovering a means for preserving the virus of pleuro-pneumonia in all its activity, has forwarded the following progress report from Sydney to the Government. The experiments of which he gives an account have extended over the last three months:—

"I inoculated two calves with the contents of two tubes filled with a virulent virus, which had been kept in darkness in my laboratory for sixty-seven days ; one of these calves died with a large œdema, the other developed only a slight œdema of no importance. This experiment proves that virus can be kept for a long time with its ordinary virulence by taking some precautions and under conditions which remain to be determined. I have continued the investigation of desiccated virus. Unfortunately it is difficult to preserve this virus in a dry state ; very great precautions are necessary in order to prevent its absorbing the humidity of the atmosphere. Despite this difficulty, which somewhat retarded my studies, I inoculated two calves with desiccated virus which had been kept for forty-five days; one of these died

with an œdema twenty-seven days after the operation, the other manifested no developments as a result of the inoculation. Upon the recommendation of Mr. A. Bruce, the chief inspector of stock, I dipped some pieces of thread in the virus of an animal which had died of the disease, and then put them to dry as indicated in my last report. In this manner small scales which cover the threads are obtained. One of these threads, inoculated as a seton in the dewlap of a calf, produced an œdema. These threads if they can thus preserve the virulence could be placed in tubes, in certain numbers, and would be of great service in practice, as they could be used according to the methods actually employed in the bush. I have endeavoured to preserve the virus by placing it in contact with weak or slightly soluble antiseptics. I experimented with 'naphthol beta' and boracic acid. The latter has been mentioned recently in Queensland as a possible aid to the preservation of virus. These experiments are in course of execution, and I cannot yet give the results. It is often rather difficult to look with certainty for the production of a large œdema on a calf after inoculation at the shoulder, and in practice it is necessary to inoculate two or three animals in order to obtain an œdema full of the necessary virus. It would, therefore, be of importance to discover a means of producing this œdema and causing death with more certainty. Moreover, if instead of having a mortality of one-half or two-thirds after inoculation there existed a sure method of causing death, it might permit of rendering even more conclusive the already convincing proofs of the value of preventive inoculation. I am, therefore, engaged in seeking a solution of this problem, of which an elucidation is very possible. Already during the course of one experiment made with a view of causing less resistance in the tissues at the point of inoculation, by means of the injection before the inoculation of virus of a substance producing an irritating effect on the tissues, I obtained a voluminous œdema with a rather shorter period of incubation. I am pursuing these experiments at the present moment."

TUBERCULIN AS A DIAGNOSTIC AGENT IN CATTLE.

M. NOCARD (*Sem. Méd.*, October 14th, 1891), has submitted no fewer than 57 bovine animals, in which *post-mortem* examination was afterwards made, to the action of tuberculin. Of these 57 animals, 19 reacted within from ten to twenty hours after a single injection of 20 to 40 grammes of tuberculin, an elevation of temperatnre of from 1·4 to 2·9 taking plaee. Of these 19 animals *post-mortem* examination proved that 17 were tuberculous in various degrees, and that 2 were not; 1 of these, in which the temperaturc only ran up 0·2° had cirrhosis of the liver, whilst a second had lymphadenomatous growths. Of the 38 animals in which there was no temperature reaction, 2 were so tuberculous that the injection of tuberculin was not necessary for the recognition of the disease. Of the 17 animals in which tubercnlin gave a diagnostic rise of temperature, 8 were in good condition, and it would have otherwise been impossible to determine that they were suffering from tuberculosis. Of those that gave no reaction, there were animals of all sorts and conditions: 2 had acute pleuro-pneumonia, 2 chronic pleurisy with sequestra, 1 parasitic bronchitis, 3 echinococcus of the lung, and 1 actinomycosis of the jaw. So convinced is Nocard of the value of this substance as a diagnostic agent, that he holds that all dairy cows should be tested by the injection of tuberculin, and that all that react should be eliminated from the milk supply, and should not be bred from. He points out, however, that it is only one diagnostic of a series, and that no other method should be neglected.—*British Medical Journal.*

SHEEP-SCAB IN GREAT BRITAIN.

DURING the past year this disease was much more prevalent in Great Britain than it was in 1889, although the area over which it was distributed was not enlarged. The report of the Veterinary Department of the Board of Agriculture, says that the existence of sheep-scab was reported in 75 counties in the course of the year, the same number as in 1889. In England sheep-scab existed in 44 counties last year as compared with 43 in 1889; it existed in 11 in Wales instead of 10, and in 20 in Scotland as compared with 22. The number of fresh outbreaks reported was 1,506, an increase of 299, while the number of sheep attacked increased from 22,023 in 1889 to 35,369 last year. The increase in the number of outbreaks was not confined to one part of Great Britain; in England they rose from 901 to 1,118; in Wales from 227 to 263; and in Scotland from 79 to 125. The number of sheep said to have been attacked increased in England from 18,297 to 30,329, in Wales from 2,781 to 3,828, and in Scotland from 945 to 1,212; thus the increase was pretty general throughout the country.

Only the five counties of Berks, Cambridge, Dorset, London, and Middlesex in England, the county of Carnarvon in Wales, and the fourteen counties of Berwick, Caithness, Clackmannan, Cromarty, Dumbarton, Inverness, Kincardine, Kinross, Nairn, Renfrew, Ross, Roxburgh, Selkirk and Sutherland in Scotland were free from sheep-scab throughout the past year. Sheep-scab has been most prevalent during the past five years in Cumberland and Monmouth in England, Merioneth in Wales, and Bute in Scotland. It seems very strange that Monmouth, with 200,311 sheep, should have had 124 outbreaks of scab last year, while Dorset, with 418,945 sheep, was free, and Northumberland had only two outbreaks among 1,002,928 sheep. Again, in Scotland, if we compare Inverness and Bute, the former, with 675,148 sheep, had no sheep-scab, while the latter had 53 outbreaks, the total sheep in the county being only 50,449, not a tenth of the number in Inverness.

TUBERCULOSIS OF DOMESTICATED ANIMALS.*

BY J. M'FADYEAN, M.B., B.SC., F.R.S.E.

(Concluded from page 357.)

MORBID ANATOMY.

Distribution of the Lesions.—The structural alterations excited by the tubercle bacillus vary in their distribution, and in their micro and macrosopic characters, according to the species of animal attacked. It is customary to draw a distinction between a local and a generalised Tuberculosis. In generalised Tuberculosis the distribution of the lesions indicates that the bacilli have gained access to the blood-stream; in the capillaries of various organs (lung, spleen, kidneys, liver) the bacilli become arrested, and by their growth and multiplication they lead to the development of a miliary tubercle. In the course of nature, a general Tuberculosis is always secondary to a local Tuberculosis. In the latter the lesions may be very extensive and widespread, but the vehicle of transport of the bacilli has not been the blood current. In the lower animals, the infective agents of Tuberculosis in the vast majority of cases penetrate the tissues from the respiratory passages or the alimentary canal. In the former instance, the bacilli are inhaled as atmos-

* Read at the Annual Meeting of the National Veterinary Association, held at Doncaster on July 21st.

pheric dust, in the latter they are ingested with food or water. Occasionally the genito-urinary passages of either sex may serve as the port of entrance to the bacilli, and in very rare cases the skin or subcutaneous tissue may be first infected. Lastly, tubercle bacilli may pass from the placenta into the fœtal blood (Congenital Tuberculosis).

In the ox the most frequent port of entrance of the bacilli is the respiratory mucous membrane, and the primary lesion is usually in the lung. A large portion of one or both lungs may become infected from the primary focus by means of the bronchi or the lymphatic vessels, and eventually bacilli are transported into the bronchial lymphatic glands, and there set up tuberculous lesions.

It is doubtful whether a group of lymphatic glands, such as the bronchial, are ever the primary seat of disease, but it is certain that lymphatic glands may present advanced lesions where it is not possible to discover any macroscopic lesion in the territory drained by the lymphatic vessels entering the glands. For example, the bronchial glands may be enlarged and caseous, although there is no noticeable lung lesion, and in such cases it must be concluded that there has been a comparatively rapid transport of bacilli along the lymphatic vessels, from the air vesicle at which they penetrated, to the bronchial glands. In like manner, bacilli may penetrate by the buccal, pharyngeal, or intestinal mucous membrane without exciting prominent lesions at the precise spot at which they enter the tissues.

In a great many cases the lesions in the lungs and bronchial glands are associated with Pleural Tuberculosis, and when that is extensive the ¡supra-sternal, mediastinal, and prepectoral lymphatic glands are also affected.

In a considerable proportion of cases of Bovine Tuberculosis, the primary lesions are in connection with the alimentary tube or its associated lymphatic glands. Most frequently the bacilli penetrate the wall of the small intestines, and sooner or later reach the mesenteric lymphatic glands; in rarer cases the port of entrance is the mouth or pharynx, and then the lymphatic glands of the head and neck become secondarily affected. Penetration from the mucous membrane of the stomach is very rare. When the disease reaches an advanced stage in some of the mesenteric glands, it usually spreads to the peritoneum. Through the lymphatic connection between the pleura and the peritoneum covering the diaphragm, Pleural Tuberculosis may extend to the peritoneum, and through the same channel bacilli may be transported in the opposite direction.

Tuberculosis of the generative organs of the cow is not rare. In some instances it may be primary, but in most cases it is secondary, and produced by extension from the peritoneum. Tuberculosis of the testicle is occasionally seen in the bull; probably it also is produced by extension from the peritoneum.

Tuberculosis of the mammary gland appears to be more frequent in the cow than in any other species. The mode of infection is uncertain, but probably it also is produced by extension from the peritoneum by way of the lymphatic vessels and glands.

Tuberculosis of the liver is comparatively common. In most cases it owes its origin to the transport of bacilli by way of the portal vein or the lymphatic vessels, but it is sometimes the seat of miliary tubercles produced by the arrest of bacilli carried in the blood of the hepatic artery. In Congenital Tuberculosis the liver is probably always affected.

It is not an uncommon error to suppose that the simultaneous existence of tuberculous lesions in the lung, bronchial glands, pleura, peritoneum and mesenteric glands, denotes that the case is one of generalised Tuberculosis, or, in other words, that the bacilli must have been transported by the blood-stream. When tubercle bacilli find their way into the blood-stream they soon

become arrested in the capillaries—chiefly those of the lung, kidney, spleen, and liver, and, provided the animal lives, this arrest is followed by the development of a crop of miliary tubercles in the organs mentioned. Every animal affected with a local Tuberculosis is exposed to the risk of generalisation of the disease in this way, and it is never possible to state with certainty that such a generalisation has not already taken place, for even a prolonged microscopic examination would probably be futile to detect the bacilli arrested here and there in the capillaries, and at least a fortnight is required for the development of a tubercle visible to the naked eye. On the other hand, as already indicated, the simultaneous existence of tuberculous lesions in widely remote parts, such as the lungs, bronchial glands, mesenteric glands and peritoneum, does not warrant the conclusion that the disease is general. The distinction between local and general Tuberculosis acquires great importance in connection with the danger of the flesh of tuberculous animals as an article of human food, and further reference to the point will be made hereafter, when discussing that question. At present it may be stated that of cattle found to be tuberculous on slaughter, probably not more than two or three per cent. give evidence of generalised Tuberculosis.

In the pig a larger proportion of cases than in the ox have their starting-point in connection with the alimentary canal, and much more frequently the disease is general, as shown by the simultaneous existence of lesions in the lung, liver, kidneys, spleen, and bones. On the other hand, the serous membranes are much less frequently involved.

In the horse, strange to say, Tuberculosis almost invariably has its starting-point in connection with the intestine or mesenteric glands, indicating that in that species the agents of infection are generally introduced with the animal's food or water. The pleura and peritoneum are not rarely the seat of tuberculous new formations, and the spleen is nearly always the seat of tuberculous tumours. In a large proportion of cases the disease becomes generalised, and the lung then becomes filled with innumerable miliary tubercles. It is possible that the larger proportion of cases of general Tuberculosis in the horse may be partly due to the fact that the diseased animals are more frequently allowed to die a natural death, but probably the tendency to generalisation is greater than in the bovine species.

The number of cases of Tuberculosis hitherto observed in the dog and cat is scarcely large enough to enable one to generalise regarding the distribution of the lesions and the path or infection. In most of the cases that have come under my own observation the lungs and bronchial glands were mainly or chiefly affected. A most valuable contribution to our knowledge regarding Tuberculosis in these animals has recently been published by Jensen. In twenty-eight cases of Canine Tuberculosis observed by him and Dr. Bang at the Copenhagen Veterinary College, the distribution of the lesions closely resembled that commonly met with in the ox, the disease attacking with special preference the lung (nineteen times), liver, serous membranes, and kidney (twelve times). In twenty-five cases of Tuberculosis in the cat, the lungs were also frequently affected (sixteen times), but the serous membranes were involved in only a few cases. In a large proportion of the cases the lymphatic glands belonging to the alimentary canal were diseased, and in five animals the lesions were confined to the mesenteric glands. As a point of interest, it may be noted that out of the fifty-three cases in dogs and cats the spleen was only thrice affected.

In the fowl the lesions of Tuberculosis are, in the majority of cases, confined to the abdominal organs (intestine, spleen, liver). Tuberculosis of the lungs is much rarer than in mammals, and generally or always secondary.

In considering the structural alterations excited in the animal tissues by the tubercle bacillus, it is convenient to distinguish between the miliary tubercle

and the tuberculous infiltration, though, as a matter of fact, there is no sharp line of separation between these.

The Miliary Tubercle.—A miliary tubercle is a minute cellular nodule developed around a colony of tubercle bacilli. Such miliary tubercles may be produced experimentally by injecting the bacilli directly into the jugular vein, and in that case the resulting tubercles develop principally in the lung, but also in the liver, kidneys, spleen, and other parts. In the course of nature, large numbers of tubercle bacilli may be thrown into the blood-stream through the thoracic duct, or by extension of tuberculous disease to the wall of a vein, and in either case the bacilli become filtered out in the capillaries, and lead to the production of miliary tubercles. The histology of such miliary tubercles varies with their age, and also to some extent with the species in which they are developed. In its earliest stage, and while still invisible to the naked eye, a miliary tubercle is composed of so-called epithelioid cells, intermingled with which there may still be detected some of the pre-existing normal elements of the part. The new cells which thus lay the foundation of a miliary tubercle are derived by proliferation from connective tissue, endothelial, or epithelial cells, which have been thrown into a state of germinal activity in consequence of the irritation caused by the adjacent tubercle bacilli. Excellent material for the study of this early stage in the formation of miliary tubercles is afforded by the liver and lungs of the horse, if the animal is killed about twenty days after the injection of tubercle bacilli into the jugular vein, and equally good examples are occasionally furnished by animals dying naturally or killed at an advanced stage of the disease.

In its second stage the young epithelioid tubercle becomes invaded from its periphery by small round cells, which are simply leucocytes that have migrated out of the still patent capillaries around the tubercle. This invasion has always begun in tubercles that are already visible to the naked eye, and it soon becomes so complete as to obscure the earlier epithelioid structure. At this time, also, a third cellular element usually makes its appearance in the tubercle, viz., the so-called giant cell. As the name indicates, these cells attain a large size, and they are multi-nucleated. The body of the cell may be either round or oval, and the staining nuclei are usually confined to the peripheral part of the cell protoplasm, though pale, deformed, and unstained nuclei may frequently be made out in the central part also. The number of giant cells in a single tubercle is very variable, but in the horse, ox, and pig they are usually multiple, and their position in the tubercle is quite irregular. There has been much discussion regarding the source of these giant cells. The principal views that have been put forward to account for their formation are—(1) That they are overgrown epithelioid cells, in which there has been repeated nuclear division, without subsequent and corresponding division of the cell protoplasm; (2) that they are transverse sections of blood or lymph vessels, the endothelium of which has proliferated; (3) that they are produced by partial fusion of contiguous epithelioid cells under the influence of tubercle bacilli. The last of these theories is, in my opinion, most in harmony with the appearances observable in giant cells in tuberculous lesions of the domesticated animals.

During the growth of a tubercle there is a coincident destruction of the pre-existing histological elements of the part, including the capillary vessels, and new vessels are not formed. A sufficient nutritive supply to the central part of the tubercle, therefore, soon fails, and necrosis and caseous degeneration ensue. It must be remarked, however, that the central necrosis and caseation are, perhaps, mainly determined not by failure in the supply of nutritive material, but by noxious products degenerated by the tubercle bacilli, for the size attained by tubercles before central degeneration sets in varies greatly. Moreover, in Actinomycosis, comparatively large tubercles are occasionally formed without a trace of necrosis or caseation.

The final stage in the history of a tubercle is calcification, or filroid transformation. In the former, calcareous granules make their appearance in the necrotic part of the tubercle; in the latter, the tubercle becomes converted into a minute fibrous nodule. The second of these conditions is rarely met with in the lower animals, but calcification is very common. It is most frequent in the ox and pig, but it is met with in the horse also.

An element frequently described as occurring in a tubercle has not in the above account been mentioned, viz., a reticulum. According to my observation, no reticulum in the sense of a new formation is found in the miliary tubercle of the lower animals. In the early stage of miliary tubercles in the lung, the epithelioid cells sometimes appear set in a sort of reticulum, but it is easy to convince oneself that this is merely a remnant of the normal lung texture. A reticulum formed by the anastomosis of the branched processes of giant cells is never seen, though, strange to say, such a structure has actually been described as the distinguishing mark of tuberculous growths.

Tuberculous Infiltrations.—Paradoxical as it may appear, it is nevertheless a fact that in the lower animals the lesions excited by the tubercle bacillus are, in the majority of instances, not tubercular in the anatomical sense of the word. The chronic lesions very frequently take the form of a diffuse new growth, composed of the same elements, and liable to the same retrogressive changes as the before-described miliary tubercle. A few examples of this type of lesion may here be cited.

In the horse, as previously mentioned, this disease was until recently termed Lymphadenoma, and the lesions were regarded as belonging to the class of neoplasms. The mistake is not surprising when one takes into account only the naked-eye characters of the new growths. In the spleen, for example, these generally take the form of well-defined, tumour-like masses, which frequently attain the size of a cocoa-nut. Generally there is more or less caseation, but sometimes that is very slight, even in growths as large as a hen's egg, and when no microscopic examination is made, the new formations may easily be mistaken for sarcomatous tumours. But when the histology of these growths is examined, little doubt is left as to their true nature. Briefly described, they are composed of the elements already mentioned as occurring in the miliary tubercle—epithelioid cells, leucocytes, giant cells. Sometimes these tumours contain strands of fibrous connective tissue, and well-formed blood-vessels. Like the ordinary miliary tubercle, the new tissue in these growths is liable to necrosis and caseation, but in some cases there is very little degeneration. Occasionally the centre of the tumour becomes converted into a white pus-like material, and in all such cases that have come under my observation the bacilli were unusually abundant.

Another example of a diffuse tuberculous growth is that so frequently encountered in the serous membranes of cattle. The so-called "grapes," with which every butcher and meat-inspector is too familiar, differ so much from the type of tuberculous lesions most common in man, that doubts were at one time entertained as to whether they were really identical in their nature with the human disease. All doubt on that head is now removed, for we know that the *perlsucht* growths harbour the same bacillus as is found in human Phthisis and other forms of Tuberculosis. Had the tubercle bacillus not yet been discovered, the matter would probably still have been in dispute, for the minute structure of these bovine formations differs considerably from that of the human miliary tubercle.

The grape-like growths are sometimes described as being simple agglomerations of tubercles, but that account of their structure is erroneous. In general, they do not show any such grouping of their elements; they are diffuse growths, composed of epithelioid cells, leucocytes, and giant cells, and they also contain blood-vessels, many of which are undoubtedly newly formed,

Indeed, the formation of new blood-vessels in these growths might have been inferred on *à priori* grounds, for without such a provision for the nutritive supply of the new elements nodules of the size frequently encountered could not have been formed.

It may here be noted again that these *perlsucht* growths are not of hæmatogenous origin, and they are in no way evidence that tubercle bacilli have found their way into the circulating blood. On the contrary, a study of the new formation in its early stage favours the view that the process spreads by distribution of the bacilli on the surface of serous membranes.

Tuberculosis Broncho-Pneumonia.—In the cat I have met with several cases of Tuberculosis in which, but for the discovery of the tubercle bacillus, the nature of the disease would have remained doubtful. In these cases the lungs were most extensively diseased, the greater part of both organs presenting the naked-eye characters of Broncho-pneumonia. A microscopic examination proved that the lesion was indeed a Broncho-pneumonia, with absolutely nothing in its histological details to indicate that the process was due to the tubercle bacillus. In the first of these cases that came under my observation, suspicion was excited by the condition of the bronchial glands, which were much enlarged and partly degenerated; and on staining a lung section, tubercle bacilli were found to be present in great numbers. These cases of Tuberculosis are interesting, inasmuch as the two characters which next to the tubercle bacillus are the most constant in tuberculous lesions were entirely absent in the lungs, viz., giant cells and caseation.

Diagnosis.

The diagnosis of Tuberculosis in its early stages is difficult—generally impossible. That is true even of human Tuberculosis, and the difficulties are considerably greater when we come to deal with the lower animals. The discovery of the tubercle bacillus has proved of great service in the diagnosis of human Phthisis, but the extent to which Koch's fluid has been used as an aid to diagnosis in human practice is sufficient evidence of the great difficulty that medical men still encounter in many cases. Tuberculin has now had a fair trial in veterinary practice, and the results are decidedly disappointing. In the hands of some experimenters a temperature reaction, more or less marked, was obtained in all the tuberculous animals, while at the same time no effect was produced on the healthy control animals. Unfortunately, in other cases a distinct reaction has been obtained in the case of healthy animals, and animals tuberculous to the last degree have given no distinct evidence of reaction.

Only a very sanguine person can believe that there will ever be discovered a means of diagnosing Tuberculosis with absolute certainty when the lesion is small and situated in an organ not accessible to physical examination. But, on the other hand, by taking advantage of all the known aids to diagnosis, a tolerably certain opinion may be formed in most cases in which the disease has advanced so far as to disturb some of the normal functions. As a general rule, it may be stated that for the diagnosis of Tuberculosis *intra vitam*, staining for the bacillus has not a great *rôle*, for the simple reason that in many forms of the disease in the lower animals the bacilli are not to be found in any of the discharges, or are present in such small numbers as to make their demonstration by means of the microscope a matter of great difficulty. Uterine and mammary Tuberculosis are notable exceptions to this rule, but it must not be forgotten that the milk may be infective although a prolonged microscopic search has not revealed a single bacillus. Greffier has shown that in bovine pulmonary Tuberculosis the pharyngeal mucus is infective when inoculated under the skin or into the peritoneum of guinea-pigs, and the same test might, of course, be employed in the case of other discharges. For

clinical purposes this method of diagnosis is scarcely available, as a period of at least three weeks must elapse before the guinea-pigs are killed, and, moreover, in this country such an experiment would be contrary to law unless the operator held a licence under the Vivisection Act.

Finally, rectal exploration may be mentioned as a valuable aid to diagnosis, and one which is too often neglected. Both in cattle and in the horse, enlarged glands or peritoneal growths may thus be felt.

The Danger of the Milk and Flesh of Tuberculous Animals as Articles of Human Food.

1. *Milk.*—Regarding the danger of milk from tuberculous cows, opinion at the present day is almost unanimous. It admits of no denial that Tuberculosis of the cow's udder is not a rare disease, and it is equally certain that when that organ becomes the seat of Tuberculosis, the bacilli at a comparatively early stage of the process are present in the milk. Such milk invariably proves infective when susceptible animals are experimentally fed with it, and there is every reason to fear that the result is the same when it is unwittingly consumed by human beings. The only point now uncertain is whether the milk may be infective while the mammary gland itself is still apparently healthy. In view of the positive results obtained with the milk of cows in which no udder lesion could be detected, it cannot be asserted that the milk is devoid of danger even when the Tuberculosis is slight and apparently confined to some organ remote from the udder. At the same time, there is still reason to hope that tubercle bacilli are present in the milk only in cases of general Tuberculosis, or when a tuberculous lesion exists in the udder itself. The danger to human beings is even then a most serious one. At the present time, milk from cows with Tuberculosis of the udder is being daily distributed in every city in the kingdom, and there exists no adequate legal machinery to prevent its sale. There are two methods by which the danger might be reduced to a minimum or altogether removed. The first of these lies in the hands of the consumer, viz., to raise the milk to the temperature necessary to ensure the death of tubercle bacilli or their spores. Dr. Bang has shown that even when the milk is rich in tubercle bacilli, it is rendered non-infective by a short exposure to a temperature of 85° C. By the simple precaution of steaming the milk for a few minutes, everyone can therefore absolutely defend himself against the danger of contracting Tuberculosis through this common and almost necessary article of diet; and in the existing state of affairs, every parent who is not informed regarding the health of the cows from which the family milk is obtained, would do well to see that this precaution is adopted, at least in the case of milk for young children. Unfortunately, milk that has been boiled or steamed is to many persons unpalatable, and hence many will doubtless prefer to continue to use it raw, even although its consumption in that state is not free from danger.

But the public have surely a right to demand that when they purchase what purports to be wholesome milk, that article of food shall not have mixed with it the germs of a deadly disease. The absolute assurance that milk is free from tubercle bacilli is probably not attainable, but it would not be difficult to frame and carry out regulations that would greatly diminish the present risk. All milch cows ought to be submitted to a veterinary examination at intervals of not more than a fortnight, and every dairy-keeper ought to be interdicted from selling the milk from a cow that in the opinion of the veterinary inspector is the subject of Tuberculosis in any organ of the body. If anyone considers that such restrictions on the sale of milk would be too harassing for the farmer or dairyman, it may be pointed out to him that con-

ditions much more stringent have been imposed upon the cow-owners supplying milk to some of the largest and most profitable dairy companies in the world, notably the Copenhagen Milk Supply Company.

2. *Meat.*—Regarding the danger attending the consumption of the flesh of tuberculous animals, opinion is much more divided. It is contended, on the one hand, that "human Phthisis comes frequently from the butcher's stall," that bovine Tuberculosis is a disease *totius substantiæ*, and that the entire carcase ought to be condemned whenever a tuberculous lesion, no matter how circumscribed its apparent limits, is discovered in the body. On the other hand, there are many who maintain that only a small proportion of cases of human Tuberculosis can with any reason be ascribed to infection through tuberculous flesh, that in the vast majority of cases bovine Tuberculosis is a local disease, and that the health of the public is sufficiently safeguarded when the visibly diseased parts and their lymphatic glands are withdrawn from consumption.

The opinion that the consumption of tuberculous flesh is a main cause of human Tuberculosis is negatived by every consideration bearing on the point. In an overwhelming number of cases of human Tuberculosis the disease has its primary seat in the lungs or bronchial glands, and countless experiments prove that such a localisation of the lesions indicates unmistakably that the virus has penetrated by the respiratory mucous membrane. Even if animal Tuberculosis were stamped out of existence, Phthisis might continue to rank as the greatest scourge of the human race. Only those cases of human Tuberculosis in which the primary lesions are seated in the alimentary canal or its associated lymphatic glands can reasonably be ascribed to infection by means of bacilli contained in ingesta, and, indeed, of this restricted list many cases are almost certainly due to ingestion of bacilli that previously had a human being for their host. But even admitting this, the danger attending the use of tuberculous flesh is still to the human sanitarian a matter demanding careful consideration. If only one per cent. of cases of Tuberculosis in man were caused by eating flesh from animals affected with Tuberculosis, it would still be the duty of medical men and veterinary surgeons to make every effort to make the transmission of the disease in that way impossible.

It is a matter for surprise that there should still be uncertainty as to whether the entire carcase, and more particularly the muscles, of an animal contain tubercle bacilli whenever a tuberculous lesion exists in any part of the body. Strictly speaking, probably no one takes up the absurd position of maintaining that a localised Tuberculosis never occurs, but it is contended by many that in a large proportion of cases of Tuberculosis in which the discoverable lesions are confined to one organ and its lymphatic glands, the bacilli are already distributed throughout the entire system by means of the blood-stream. Others believe that bovine Tuberculosis, like Actinomycosis, is in the majority of cases a local disease, and that it is only in a small proportion of cases that the entire system is contaminated with the bacilli. This, it is evident, is a dispute capable of being settled by experimentation. It has not yet been definitely settled, and, indeed, the number of experiments bearing upon the point in dispute is comparatively small. The older, and some of the recent, experiments made with tuberculous products throw absolutely no light on this point, and must be put aside. For example, the result of a feeding or an inoculation experiment with visibly tuberculous materials cannot be cited in this connection; and even when the matter used for inoculation has been taken from an apparently healthy part of the body, the experiment is valueless unless the precautions necessary to prevent accidental contamination have been strictly observed.

The three largest series of experiments with expressed muscle juice have been made by Bollinger, Nocard, and Galtier. Bollinger found the juice non-

infective in every case (twelve); Nocard found it once infective in twenty-one experiments; Galtier found it infective six times out of twenty-five. To these I may add a series of fourteen experiments recently carried out by myself, at the request of Professor Brown, in which the result in every case was negative. It thus appears that out of a total of seventy-two carcases experimentally examined, a positive result was obtained in seven cases, and it will be noted, as a remarkable fact, that six of these seven cases occurred in the hands of one experimenter. If one were warranted in concluding from these experiments that the muscular system contains tubercle bacilli in about 10 per cent. of all cases of apparently local Tuberculosis, the case against partial seizure would be made out; but until a larger number of experiments have been made, there must remain a doubt that at least some of the positive results obtained by Galtier were due to accidental infection. Unless the strictest antisepsis is maintained throughout the whole course of such an experiment (sterilisation of knives, meat press, syringes, hands, etc.), a positive result carries no weight.

It must thus be left to further investigation to settle whether, in any considerable proportion of cases of apparently local Tuberculosis, the bacilli are distributed throughout the body; but the experiments already made tend to show that the danger of Tuberculosis being communicated to human beings by the ingestion of meat from tubercular animals is not so great as it has sometimes been represented. Even taking the whole series of experiments into account, the result in the great majority of cases has indicated that the muscle juice was non-infective, and it ought to be remembered that these experiments are very far from imitating the actual conditions of risk to which human beings are exposed. In the first place, the muscle juice was employed in the raw state and in relatively enormous doses; secondly, it was in most cases injected into the peritoneum—a much more potent mode of infection than by the alimentary canal, and finally, the animals experimented upon were rabbits and guinea-pigs, which are probably much more easily infected than human beings.

The International Congress for the study of Tuberculosis, held in Paris in 1888, voted in favour of total seizure, and a similar resolution was almost unanimously passed by the International Veterinary Congress which met in the same city in 1889. Notwithstanding these declarations in favour of total seizure, that practice is, I believe, nowhere followed; and in this country, where meat is not consumed in the raw state, there is probably no appreciable risk in passing for consumption the entire carcase when the lesions are confined to one organ and its lymphatic glands.

The Prophylaxis of Tuberculosis.

Under this heading I propose to consider shortly what are the circumstances that contribute to the present prevalence of Tuberculosis among our domesticated animals, and from them to deduce the measures best calculated to diminish or suppress the disease.

1. *Predisposition.*—Every case of Tuberculosis is caused by the entrance of the tubercle bacillus into the animal body. That admits of no discussion. Formerly it was believed that the cause of Tuberculosis was to be sought in a peculiar quality of the tissues of the body, in consequence of which inflammation, by whatever cause produced, tended towards a caseous metamorphosis of the inflammatory exudate, and a subsequent general infection by absorption of some product of the caseous degeneration. This peculiar tissue weakness was supposed to be eminently hereditary, and an explanation was thus offered of the observed fact that the offspring of tuberculous parents themselves frequently became tuberculous.

When Koch proved that without the tubercle bacillus there could be no

Tuberculosis, to account for the special prevalence of Tuberculosis in particular families it was assumed that the tubercle bacillus had an ubiquitous distribution on the earth's surface, that every one was therefore frequently or constantly exposed to the infection, and that the large proportion of victims claimed in particular families was ascribable to a special tissue weakness in consequence of which the tubercle bacillus was able to propagate with vigour within the body. This explanation of the fact is now held by very few, and in the main it is undoubtedly erroneous. What we know regarding the conditions necessary for the continued existence of the tubercle bacillus in the outer world, leads us to expect that the organism cannot be everywhere present, and experiment has fully proved the correctness of that supposition. At the same time it is by no means disproved that constitutional predisposition does not play an important part in determining what individuals shall be the victims of Tuberculosis. Indeed, one might go further, and assert that the observed facts, both in human and veterinary practice, strongly support the view that with Tuberculosis, as with several other diseases, the tissues of certain individuals and races offer an unusually congenial soil for the propagation of the parasite. The Shorthorn and Ayrshire breeds of cattle are almost universally credited with a marked susceptibility or predisposition to Tuberculosis, and probably, many veterinary surgeons, as the result of their own observations, are absolutely convinced of the correctness of this opinion. That an unusually large number of animals of these breeds fall victims to Tuberculosis cannot be gainsaid, but, as will subsequently be pointed out, other factors besides racial predisposition may contribute to that result.

Heredity.—Is Tuberculosis frequently inherited? To this question many will probably without hesitation answer in the affirmative, and yet a full consideration of all the evidence appears to justify precisely the opposite conclusion. To prevent any possibility of misconception, it may be well to explain that the point now being considered is whether any notable proportion of animals are at the moment of their birth already tuberculous or harbour the tubercle bacillus within their tissues. If congenital Tuberculosis were common, then the bovine species ought to furnish a large number of examples, (1) because Tuberculosis is extremely common almost everywhere among milch cows, (2) because Tuberculosis of the genital organs is probably more common in the cow than in any other animal, and (3) because an immense number of calves are killed and eviscerated immediately after birth. Nevertheless, there are on record only seven cases of indubitable congenital Tuberculosis in the calf, and to explain that fact in any way consistent with the view that more than an inconsiderable proportion of bovine animals are tuberculous at the moment of their birth, is quite impossible. If any further proof in the same direction were required, it would be found in the circumstance that the proportion of Tuberculosis is vastly greater among adult than among young cattle.

Infection.—If the tubercle bacillus is not ubiquitous, and if, save in quite exceptional instances, animals are born free from that organism, how, it may be asked, is any disease contracted? To answer that question, let us limit it to the case of cattle. An animal that is already the subject of Tuberculosis is a sort of natural hot-bed for the propagation of the specific germ. In every tuberculous focus the tubercle bacilli grow and multiply, and since in many instances vast numbers of the organisms are passed into the outer world, every tuberculous animal tends to contaminate its immediate surroundings, and is a source of danger to other susceptible animals kept in contact with it. The extent to which a tuberculous animal contaminates its surroundings with tubercle bacilli depends in large measure on the localisation of the disease. For example, an animal might be the subject of Tuberculosis of the serous membranes or of the lymphatic glands, and yet be without danger to

its companion animals; for when the lesions are strictly localised to the parts mentioned, there can be no outward passage of the bacilli. But the case is different when a tuberculous focus exists in the lung, for tubercle bacilli are then usually discharged into the outer world. These organisms, however, are not, as is sometimes supposed, passed out in suspension in the expired air. They are contained in the bronchial mucus which is projected through the nose in the act of coughing, and such expectorated mucus adheres to any surface against which it may have been projected, or speedily falls to the ground. In the moist condition the expectorate is but slightly dangerous, so far as infection of the respiratory passages is concerned, but what settles as a speck of mucus on wall or woodwork will soon become desiccated, and if detached it may pass into the atmosphere as a dust particle, and be inhaled by any inmate of the same building. This, beyond any doubt, is the common mode of infection in the case of bovine Tuberculosis. Everything is plain when that view is adopted. Tuberculosis is a disease of domestication, in the literal sense of the word. Our young stock (exception being made of the infection through milk) are exposed to less risk than adult stock, for they are less closely housed. Dairy cows, and especially those kept in city byres, are the most frequent victims of Tuberculosis, because they are frequently stalled the whole year round. The disease proves more infectious in proportion as the animals are overcrowded, and in proportion as the ventilation is defective, for these conditions obviously favour the transmission of bacilli from animal to animal in the manner above sketched.

In the light of the preceding account of infection, it is evident that the special prevalence of Tuberculosis in particular breeds and families may erroneously be ascribed to a special constitutional predisposition. As previously mentioned, Shorthorns and Ayrshires are generally credited with such a predisposition, but these are *par excellence* our most highly domesticated breeds, and hence the risk of infection are proportionately great. It would obviously be fallacious to take as the criterion of predisposition or diathesis the proportion of cases occurring in two such breeds as Galloways and Shorthorns; and experience proves that even West Highland cattle and other mountain breeds show no pronounced resistance to infection, when they are housed with tuberculous animals in badly ventilated buildings.

Tuberculosis, according to our present knowledge, is an incurable disease but it is an eminently preventable one; and its present alarming prevalence is the natural result of the almost universal neglect of those prophylactic measures that are indicated in the case of every infectious disease. It is the province of the veterinary profession to diffuse among stock-owners a knowledge of the true nature of the disease, and to point out what are the rational means of prevention. These may be briefly summed up as follows:—

1. Systematic inspection of the stock at short intervals with a view to detecting Tuberculosis as early as possible. Every animal reasonably suspected of being affected (and this applies especially to animals that give evidence of pulmonary Tuberculosis) ought to be promptly slaughtered or isolated.

2. Adequate ventilation of cow-sheds and other cattle buildings.

3. Cleanliness and periodic disinfection of the walls, floor, woodwork, etc.

These measures could not be expected to promptly exterminate such an insidious and widespread disease as Tuberculosis, but it is not an unreasonable hope that if they were systematically enforced, the malady would in a few years be reduced within very narrow limits.

VETERINARY HYGIENE. *

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In discussing all questions at a Congress of this kind we have to show, firstly, how much we know of the subject, and secondly, how much has yet to be learned. In no section could any question of Veterinary Hygiene be better taken up than in this one; it is proved beyond doubt that there are diseases transmissible from animals to man, and certain preventive measures naturally suggest themselves. Now, these preventive measures, so far as animals are concerned, fall entirely within the province of the veterinary surgeon, and it will be my duty in this paper to show how far we, as a profession, are prepared for the responsibility thus thrust upon us, and what measures we adopt to ensure that in the matter of State medicine, we are endeavouring to keep pace with the progress of science.

The conditions under which animals live in this country cannot be considered satisfactory, it is true that in many respects we are ahead of other wealthy nations, but, taken all round, it is difficult to make the horse and stock owner place a real value on those laws which govern the health of the animal community, or to estimate, when he is not immediately the sufferer, the cost of disease. Parkes' axiom that nothing is so costly as disease, and nothing so remunerative as the outlay which augments health, applies with as much force to the lower animals as to mankind.

To establish our position it is necessary that I should briefly review the aims and scope of Veterinary Hygiene, and endeavour to show in what a variety of spheres its usefulness may be demonstrated.

Taking firstly, then, the most natural sequence of events, viz., breeding, we find that though in some cases considerable care is taken in the selection of animals for this purpose, yet a great deal in this direction still remains to be done. It appears very difficult for the ordinary lay mind to grasp the fact that "like breeds like," the consequence being that in one class of animal, namely horses, the amount of hereditary unsoundness amongst them is simply appalling. Veterinary surgeons of great experience in the examination of horses for soundness will tell us that a really sound animal is a *rara avis*, and that the unsound one is so common that we have been compelled to adopt a certain paradoxical formula in describing an unsound horse which is fit for work, viz., as practically sound. The term is a loose one scientifically, and logically incorrect, but as a saving clause it is essential so long as want of care and more thorough supervision in the breeding of horses is withheld.

The whole country should be indebted to those various societies, prominent amongst which is the Royal Agricultural, which have endeavoured to improve the soundness of our equine produce; their work in this direction is a grand one, though the results are of necessity slow in developing themselves. We must reach not only the big breeder but the small one also, we must teach the small farmer and horse owner that when a mare is no longer fit for work, through incurable lameness or other cause, that she is a most unsuitable subject to breed from, and yet this exactly represents our case at the present day. No longer fit to work through disease, the mare is used to breed from, and the results are, as may be imagined, sapping our vitality as a horse-breeding nation, and throwing on the market worthless and unsound animals.

Our position in the matter is very clear, it would be too much to expect legislative interference in the matter of either horse or mare, the remedy lies with our horse societies, and by instructing the masses; the former are

* Read at the International Congress of Hygiene and Demography.

keenly alive to their responsibilities in this matter, the latter we can only hope to deal with through the civilizing process of education.

The position of Veterinary Hygiene in respect to the breeding of animals is this,—we can impress the necessity of using sound adult stock; we can teach the conformation best suited for different kinds of work, what to accept and what to reject; we can urge the necessity of breeding from mature animals, of feeding the pregnant animal liberally on that class of food best suited to the requirements of mother and fœtus; we can show the necessity for protecting the larger animals which are in a pregnant state from wind and weather, and placing them under hygienic conditions; we can point out how neglect in this direction is a common cause of abortion, how the latter may also be produced by certain kinds of food, bad odours from drains, etc. We can carefully direct the feeding of the young stock according to their requirements, impress the urgent necessity for liberal attention in this matter, and the disastrous consequences of systematic starvation in the ultimate stock; in fact, the advice which we can render to the breeder of all classes of animal is almost endless, and in course of time it must make itself felt. At present our horses are consumed by unsoundness of limbs and wind, our cattle by tuberculosis. The application of the laws of hygiene would in ten years revolutionise the existing state of affairs.

During the growth of young animals we can advise about their feeding, the nature, quality, and quantity of food required, and in the case of cattle, their fattening and general care. The training and management of the young horse is a point on which we are especially capable of affording useful information, as there can be no donbt that much harm is done to young horses at this time from being worked beyond their strength.

In this way we can follow the animal until it arrives at adult life; we now deal especially with their food and feeding, water and watering, ventilation and drainage of their stable or buildings, the regulation of their work, the fitting of their saddle and harness so as to prevent injury and enable them to perform their work with the least expenditure of force; the care of the feet and prevention of disease by attention to shoeing. Advice respecting the clipping of their coats in winter, their grooming and general cleanliness, the prevention of stable accidents by the adoption of due precautions suggested by experience. In this way our unremitting care and attention will ward off disease and accident, and extend their useful lives.

But our advice does not even end here; during epizootics we can prescribe the best methods of avoiding infection and reducing loss amongst those attacked; in the case of infectious diseases we can stay their spread by the adoption of methods of isolation, destruction and disinfection, and we can advise on the best methods of disposing of the bodies of diseased animals to prevent further spread of infection.

Apart from the above there are special branches of Veterinary Hygiene (one of which it will be the object of this paper to expound) which are of public interest and utility. I have alluded to the stamping out and suppression of infectious diseases, this legitimately falls under this section; Veterinary State Medicine received its impetus in this country from the fearful visitation of the cattle plague. Our insular position affords us exceptional facilities for keeping away from these shores diseases which on the continent of Europe are enzootic; on the other hand, the enormous supplies required by this country, necessitating the importation of cattle from both Europe and America, exposes us daily to infection. Our port inspection and quarantine methods are entirely to be thanked for the exclusion of such diseases as cattle plague, sheep-pox and lung-plague. Owing to the difficulty of diagnosis, cases of the latter no doubt escape detection, but on the whole our port inspection is excellently performed, and the public has but a faint

notion of the value of the work carried out, and the jealous watch unremittingly kept over the agricultural and public welfare.

Meat and milk inspection is a special branch of Veterinary Hygiene; we do not for one moment pretend to say what food is suitable for human consumption, this obviously falls to the share of medical officers of health, but we can speak with certainty as to the condition of the animal furnishing the meat, and the state of health of the cow. It is clear that here Human and Veterinary Hygiene overlap; we meet on a common platform, we each have our clearly defined sphere in the matter, and it is certain that meat and milk inspections can only be efficiently performed where the two professions combine in the whole work of guarding the public health.

It would be a false position for the Veterinary Hygienist to state that such and such food was fit for consumption; he can say in the case of meat that the appearance was that of perfect health, or that the change, if any, had caused no important alteration in the tissues; with the medical officer alone must rest the responsibility of rejecting or passing it; the same argument applies to milk; we can say that the animal presents no sign of disease, that local or other ailments are in our opinion of an unimportant nature; we cannot obviously decide as to whether the milk is fit for food, any more than the medical officer can assert that the local condition we regard as trifling are to be taken in a serious light.

The last branch of Special Veterinary Hygiene, to which I will only briefly allude at the present moment, is the production of animal lymph for the purpose of human vaccinations; here, again, we meet the medical officer on a common platform. In the abstract, we know nothing of vaccination as a protection against small-pox, but as veterinary surgeons we do know cow-pox; we understand the best conditions under which it can be cultivated, know exactly at what period the most suitable lymph for the human subject can be removed, and have a clear comprehension of the feeding, management, and handling of the animals employed in its cultivation.

Briefly, therefore, these are the aims and scope of Veterinary Hygiene; we seek to make ourselves of use to the public in many varied capacities; we can advise the breeder on the selection of stock, the Government on the soundness of its horses, and their management and care; the large and small horse owner on the feeding and general management of his stud; the farmer on the prevention of disease amongst his stock; the State on the best methods of excluding and combating epizootic disease; and the medical profession we can enlighten on those diseases transmissible from animals to man, the condition of meat and milk from a veterinary point of view, and can supply them with a never-failing and safe source of animal lymph; we may claim, therefore, that we have a distinct sphere of usefulness; how far we are prepared at present to occupy this sphere is a question I propose to deal with later on.

It is a remarkable thing that people who, so far as they themselves are concerned, will take every reasonable precaution to preserve their health, forget to or do not see the necessity of applying the same laws to animals which are their property. I need not remind you that there is one Hygiene in the same way as there is but one Pathology. The laws which regulate the health and welfare of the human race, equally apply to the animal community, with certain modifications which do not affect the correctness of the statement; we have, therefore, every reason for saying that the magnificent results obtained by human hygienists may also be obtained by veterinary, and more than this, the latter are capable of showing the value of their sanitary reforms in actual money. The introduction of sanitary science into the French army saved £25,000 per annum in the purchase of horses alone; the invasion of cattle plague into this country cost £5,000,000, sterling.

Owing to the absence of statistical data, it is impossible to assess the value of sanitary science in our army, but we do know that diseases which a few years ago were common are now never seen, or if cases occur, they can clearly be traced to outside sources of infection; the result of this is that we have prolonged the useful life of army horses, and placed them under such favourable hygienic conditions, that no European army can in this respect compare with ours. The saving of money must, therefore, be considerable.

No matter how perfect the machinery for the snppression of epizootic diseases may be, we cannot hope to successfully cope with outbreaks without the intelligent co-operation of the public; our sanitary triumphs in the army have been won simply by the assistance rendered by higher authority; it is here where we fail in civil life, every individual considers he has no right to be interfered with, or that his liberty of action must not be unduly controlled. One of the most recent examples of this prejudice is the considerable ill-feeling with reference to the muzzling order for the prevention of rabies. So unnatural is the selfishness of the dog-owning public, that the misery and horrible death inflicted upon their fellow-creatures is a trifling matter compared with the inconvenience occasioned to the canine pet by having his head enclosed in a wire cage.

It is certain that if the causes operating in the production of disease were better known to the public, their appreciation of sanitary laws for the suppression of such would be correspondingly increased, and this is one of the useful results which we may expect to follow as the result of this Congress.

At no time in the history of medicine has more attention been directed to diseases transmissible from animals to man; it is not too much to say that some of these are positively under the control of hygiene, of which the best example is glanders of the horse; others we are not so clear about as to the causes influencing their production, but one thing is absolutely indisputable, and it is that where epizootics break out amongst animals living under sound sanitary conditions, the mortality is low, whereas, on the other hand, when such diseases appear in animals living under mal-hygienic conditions, the mortality is high, and convalescence protracted; the best example of this statement is influenza.

A consideration, therefore, of the important factors operating in the spread or production of disease amongst animals must now occupy us, and I will first deal with the questions of *Water*.

The generally accepted notion is that any water is good enough for animals, and certain arguments are used to prove this, one being that horses prefer dirty water from a pond to clear well water. The argument is not, however, sound; the explanation is that he prefers softt to hard water. There can be no doubt that in order to maintain a perfect state of health, a pure water supply is absolutely necessary for animals, but little attention has been given in this respect, especially to cattle.

We are aware that there are forms of organic matter in water which appear to produce no ill effects on animals, probably for the reason that they are not susceptible to any fever resembling typhoid, but sewage in water, without doubt affects them, producing abortion in pregnant animals, malignant and other forms of sore throat in cattle. I have never, however, witnessed any ill effects in the horse, probably for the reason that the amount partaken of was insufficient to produce harm. Animals have been known to suffer from diarrhœa when partaking of water from a well within 100 yards of where diseased animals had been buried the previous year. The flesh and milk of animals receiving a polluted or foul water supply has often a bad taste and odour.

Sulphurous acid finds its way into water in certain manufacturing districts; its effects on animals is to give rise to diseases of the bones. Water charged with lime has been known to produce bony enlargements in horses, and in the form of sulphate and carbonate of lime it produces certain changes in the digestive canal, resulting in loss of condition and indigestion.

Goitre had been known to affect horses and mules in those districts in France where goitre is common in man, and is attributed to the nature of the water supply. Cystic calculi, particularly in sheep, have been attributed to hardness of the water; this disease is certainly more common in the limestone districts.

Water as a means of transmitting certain epizootics goes without saying. The London water trough is perhaps the most common means of transmitting glanders in horses. Foot and mouth disease, cattle plague and anthrax, are all readily transmitted by the water supply.

The points we would urge with regard to water are these:—

More care in obtaining a pure source of supply and preventing it from becoming polluted.

Soft water, if possible, to be given: stagnant pools avoided, those ponds containing living vegetable material being probably much safer, owing to the oxidising power of growing vegetable life.

The protection of wells, ponds and streams used for cattle and horses from sewage and other pollution.

Cleanliness of water-troughs, buckets, and other vessels used for watering from.

An unlimited supply; horses are often stinted.

The greatest care is required in the watering of horses; owing to their anatomical construction, one of the golden rules of feeding should be that horses are to be watered first and fed afterwards; neglect of simple hygienic law entails a heavy loss of life annually, the cause of death being rupture of the stomach or intestines, or twist of the latter, all resulting from an attack of ordinary colic.

The *Air* of buildings inhabited by animals has received very little care or attention excepting in the army; here for many years past no money has been spared to render the atmosphere of stables pure and free from smell, and our efforts in this direction have met with remarkable success.

It is difficult enough to make a man believe that he is risking the health of his animals by feeding them on mouldy food, but when he is told that he is risking their lives by making them breathe foul air, he positively declines to believe it, his argument being that the animals must be kept warm. The first efforts in Veterinary Hygiene were directed against this pernicious practice of closing doors and windows and practically suffocating animals. We have to remember that any warmth in a stable or cowshed not heated artificially, practically arises from the heated air from the lungs of the occupants; in Veterinary Hygiene, then, heated air may always be regarded as foul air, for not only is it charged with the impurities from the lungs, but also from the decomposition of excreta.

The carbonic acid in the air of stables is, with care, a perfect index to the respiratory purity of the atmosphere. The care which, in the case of stables, has to be exercised in selecting a sample of air for the determination of CO_2, is to take it at least six feet from the ground, otherwise the presence of ammonia arising from the decomposition of urea affects the analysis by Pettenkofer's method.

From over 250 analyses of stable air I obtained some interesting results. 1. The purity of the air depended upon the type of stable; where ridge or louvre ventilation existed in the roof the air was comparatively pure, the

changes being frequent. 2. In those stables which had dwelling rooms and lofts over them the atmosphere was generally foul, assisted also by the fact that in this class of stable, windows are few and far between.

The above experiments showed that Professor de Chaumont's number for permissible organic impurity ·2 of CO_2 per 1,000 vols. of air holds good for stables. During this inquiry some very considerable quantities of CO_2 were found, 2·65 per 1,000 being the largest. Leblanc found in a stable in the Ecole Militaire ·7 per cent. CO_2, and 20·39 per cent. O. Such impurity as this I have never met with.

Ammonia is largely met with in stable air, arising from the decomposition of urea.

The diseases produced, aggravated or spread by impure air are very numerous. We shall have to show, under the head of dietetics, that the majority of preventable diseases amongst animals are traceable to food and feeding, but certainly next to this will come impure air. There is no error which gives us greater trouble to rectify in the public mind than the common one that all windows and doors must be shut if horses are to keep in health; to such an extent is this carried, that not only are doors and windows closed, but every other means of inlet and outlet, and in days gone by even the key-hole was not forgotten. The state of this atmosphere defies description, the pungent ammoniacal vapours brings tears to the eyes, the insufferable odour produces a feeling of nausea and faintness, and in such places as these horses and cattle languish. Is it any wonder that glanders and farcy are so common in all our big cities, that pneumonia is so fatal, and blood diseases, such as purpura, only too frequent? The production of these is aggravated by the unhealthy condition of the atmosphere in which these animals exist. Before ventilation of stables was established in the army through the intervention of Professor Coleman, we have it placed on record that hundreds of animals died yearly from chest diseases and glanders and farcy; by the introduction of a proper system of ventilation this in course of time was completely stamped out, so much so that many of us have not seen a case of glanders for years, and though we have not entirely lost sight of pneumonia, yet cases are not so severe as they were, and are consequently more amenable to treatment. It is impossible to deny that these results have not been obtained through thorough ventilation and good stable management.

Much yet requires to be done in this direction in civil life, the prejudice to be overcome is immense; buildings for horses and cattle in big towns and cities in particular require that a thorough system of ventilation should be instituted, and we can only hope to establish this by instructing the public in the laws of health.

If it be possible to erase from the Government returns such diseases as glanders, it is equally possible in civil life. I have alluded to the mortality among the French cavalry previous to sanitary science being adopted by them. The admissions for glanders fell from 23·32 per 1,000 in 1847-52, to 7·24 per 1,000 in 1862-66, and during the same period non-specific diseases of the lungs and pleura fell from 104·7 per 1,000 to 3·59 per 1,000. The only conditious present to account for this remarkable change were increased facilities for ventilation and larger cubic space.

Coleman, who did for Veterinary Hygiene at the early part of this century what Chadwick and Parkes did for human hygiene some years later, held the view that glanders could be generated by the foul atmosphere of stables, and he quoted, amongst other examples, the fact that if horses on board a ship were battened down during heavy weather, that glanders occurred amongst them in consequence. It was this view of the poisoned atmosphere of the stable which laid the foundation of Veterinary Hygiene in this country. Whether the view is tenable or untenable in the present light of science this

is not a fit place to discuss, but it is an excellent working hypothesis, and has been the means of ridding the army of glanders.

Another disease which has nearly disappeared is specific ophthalmia of the horse, a disease which has no prototype in the human subject, but which steadily though surely leads, by repeated attacks, to entire loss of vision. Foul atmosphere and putrid ammoniacal vapours were blamed as the cause of it, and the disease has certainly become so rare since ventilation and drainage were adopted, that in the army a case is very rarely seen.

A disease, called in France stable fever (analogous to hospital and prison fever in man), existed in stables abroad as the result of a foul atmosphere, and in such places wounds rapidly become putrid and produced pyæmia.

Apart from diseases of a specific kind, animals kept in badly ventilated buildings are very susceptible of cold, they require more food for the amount of work performed, and colds and coughs are frequent amongst them.

A consideration of air leads us up to the important question of *Ventilation.* This is principally carried out by natural means, though there is no reason why, say in the case of milch cows (where too free natural ventilation would unduly lessen the temperature), artificial ventilation should not be adopted, in fact, it would probably have to be in winter time, if the animals were to receive the amount of fresh air they needed.

The points we have to bear in mind are these:—1. It is a simple matter to ventilate a building with an open roof, viz., one with no rooms or loft overhead, but where closed roof stables exist with but few windows, and those often badly arranged, ventilation becomes nearly impossible. 2. No stable or building for animals can be effectively ventilated by natural means where the width of the building exceeds 30 to 35 feet. Windows opposite to each other should exist on both sides of the building, between these windows not more than two animals should be placed. The old idea of having windows only at one side of the stable or only at the ends of the building, with perhaps eight, ten or more animals between opposite sources of air, is the worst method which could be devised.

Food.—The complicated apparatus essential to the digestion of vegetable food exposes the possessor to a very large number of diseases unknown to omnivora. Besides those disorders attributable directly to food and feeding, we have many others only attributable indirectly to this cause, and yet the sum of these presents an astonishing total.

It is when we come to consider food and feeding as a branch of hygiene that for the first and only time we cannot lay down one set of laws applicable to all animals, for the reason that each class is fed on a different principle, due to the arrangement of the viscera. Nothing can be more different than the feeding of horses and cattle, or sheep and pigs, yet all these animals, by means of their wonderful digestive laboratory, are capable of converting vegetable into animal tissue. To give some idea of how vastly these animals differ in the arrangement of their digestive tract, I may say that of every 100 parts of gastro-intestinal canal, the stomach in the horse is represented by 8 parts, in the ox by 70 parts, in the sheep by 66, and in the pig by 29 parts.

Animals are fed either for work or for food. In either case the principle of giving sufficient to supply daily wear and tear is obvious; horses cannot work, nor cattle fatten, nor sheep thrive on a poor or illiberal diet.

There is, perhaps, no branch of hygiene more under our control than food and feeding; the public know very little about it, and so many preventable diseases are attributable to this cause that it is clear some elementary instruction should be given to horse and stock owners.

The diseases are due to either alterations in quantity, quality or conditions of digestibility and assimilation.

Amongst the wealthy class of horse owners the tendency is to cram animals with food, leading to deposits of fat on the body, often rendering even light work a matter of considerable difficulty; this is particularly the case with carriage horses. With hacks and hunters the matter is different, the amount of work performed being equal to the amount of food given, very little is stored up in the system. An excess of food leads to diarrhœa and other disturbances, the undigested food undergoing certain changes in the bowels probably with the development of leucomaines, and not unfrequently giving rise to liver disturbance as well as bowel irritation.

A large quantity of nutriment being poured into the blood leads to changes in that fluid, especially if the animal has for some time previously been on a poor and innutritious diet. Symptomatic anthrax in cattle is attributed to this cause in England, and in India the fattest horses are invariably the victims of the virulent anthrax of that country. Excess of food leads to liver changes, inflammation of the lymphatic vessels of the limbs in horses, paralysis of the stomach, gastric apoplexy, colic and inflammation in the feet. In cattle, gorging of the stomach, tympany and impaction of the stomach, and other disorders are directly attributed to excess of food, particularly of a special kind, tympany, for instance, to excess of green food, the same cause producing tympany in the horse.

With a deficiency in food, certain marked physical changes occur in the organism accompanied by diseases which we regard as due to neglect. Scabies, glanders, farcy and dysentery occur to horses exposed to privation and severe work, such, for instance, as occurs to animals in war. Hæmo-albuminuria and Moor-ill in cattle are attributed to a deficiency in food. With a deficiency in saline matter, rickets and other diseases of nutrition follow; with a deficiency in albuminoids there is loss of energy, and with a decrease in digestible and increase in indigestible matter there is a general loss of muscular development and pendulous abdomen. We have before noted the importance of very gradually bringing animals which have been living on comparatively poor food on to diet containing more nourishment than that which they have been used to.

Diseases associated with the digestion and assimilation of food are exceedingly numerous. There are some grains which if given to animals act like poisons. Wheat, for example, will produce tympany in both horses, cattle and sheep; maize has been blamed for producing bowel and skin diseases, and in the horse laminitis; softening of the liver of horses in Egypt has been said to be due to a kind of clover. Potatoes purge horses, buckwheat has been said to produce cerebral derangement, and parsnips to affect the eyes. Laryngeal paralysis in horses has been traced to the use of certain Indian vetches, and acorns have been known, in certain years, to be exceedingly fatal to pigs, probably due to their astringency. Eczematous skin disease, common amongst horses in India, is due to feeding on wet grass.

Conditions affecting the quality of food is a very important question to the veterinary hygienist; it embraces the growth and preservation of the plant, the nature of the soil on which it is grown, and a variety of animal and vegetable parasites which infect it.

The quality of the soil materially affects the nutritive properties of the grass and grain grown on it; the time of preservation and the nature of the weather influences the feeding value of hay and grains; the weather also seriously affects the preservation of food, wet and damp inducing the growth of vegetable parasites, which not only render the food useless as forage, but in some cases actually poisonous. In this connexion, we consider bunt, rust, mildew, smut and ergot, which affect the plant during its life, and the mucors and penicellium which generally affect it after its death; we have no direct

evidence as to the invariable harm produced in the system by these parasites, though we are all agreed that they are prejudicial to animals, and that in many cases they may produce diabetes, nephritis, paralysis, inflammation of the bowels and cerebral symptoms.

The quality of food is also affected by its age, new hay produces diarrhœa and is innutritious; new oats cause purging and stomach irritation. By keeping, these harmful properties are got rid of.

Cleanliness of food is an important condition of quality; dirt finding its way into the intestinal canal is liable to accumulate and produce considerable irritation and death. Calculi have also been supposed to be produced by the same cause, though it is possible that in these cases their only effect is to act as nuclei for the deposition of the mineral matter in the food.

The preparation of food affects its digestibility. Old horses with defective teeth need their corn to be crushed, and corn crushing, even for horses with perfect teeth, facilitates digestion; cattle should have their roots sliced or pulped to prevent choking, maize and barley, beans and peas should be crushed; some grains used for feeding in India require to be boiled, and boiled foods are often used for fattening horses in this country. Boiling food is a serious error, and fraught with danger to horses, it is a prolific source of stomach and intestinal disorder, partly, perhaps, from its soft nature not producing stomachic peristalsis, but largely from the fact that boiled foods are "bolted" without being masticated.

Food is also affected by the presence in it of poisonous plants, and cattle and sheep poisoning from this cause is common, but we have said enough to show the importance of care and attention to food and feeding, and the enormous influence this presents in the preservation of health. When an outbreak of disease of a non-specific character occurs amongst animals, the food, its quality, nature, etc., is naturally, and must ever be, the first question we inquire into.

Stables.—The large majority of buildings existing in towns and cities as stables and cow-houses, etc., are not worthy of the name. The London cab stableistypical of the class, low, dark, oppressively close and muggy, flooring bad, no drainage, atmosphere reeking with ammoniacal vapours, which to a new comer irritate the conjunctiva beyond conception; the whole place tumbling to pieces, doors patched up with sacking, windows in a similar state or filled in with straw, soiled and foul bedding lying everywhere, and the level of the stable floor not uncommonly below the level of the surrounding soil. Amongst the better classes we gradually find these structural defects remedied, but the absence of doors and windows in sufficient number for lighting and ventilating purposes is very marked. It is only amongst some large companies and in the army, that stables constructed on a sanitary plan exist, and to these we will presently refer.

Cow-sheds in cities and towns are much more under control than stables; the watchful eye of the medical officer of health ensures at least the elements of sanitation being observed, but much yet remains to be done in construction, lighting, flooring, ventilation, drainage, and heating, before we can consider that milch cows are placed under healthy conditions.

The principles of construction are very clear, use virgin soil where possible, avoid made ground, low lying places, or soil in which the ground water is high. It is not much use suggesting a deep gravel where such is not the natural geological formation, but such a site is preferable to any other.

Let the walls be double to ensure dryness, the foundation and flooring of concrete to avoid the permeation of urine and fluid fæces, the width of the building not to exceed 30 feet, the animals to be arranged with their heads to the outside walls, with a passage down the centre; a large sheringham window over the head of each animal, doors at either end, the roof open, viz.,

no rooms overhead, with louvre ventilation on the ridge. The fittings to be of iron, plain and strong, the brick flooring which is placed over the concrete to be well set, not slippery, durable, impervious, readily cleaned; the drainage everywhere inside the building to be surface gutters, a very shallow one from each standing running into a wider one which runs at the rear of the stalls the whole length of the stable. Ample water supply for flushing stalls, boxes, and drains; no traps or gullies inside the building, and the walls, as high as the animal can reach, to be of cement. The cubic capacity per head should be 1,600 feet, and the superficial area of the stall 70 feet, and with share of central passage, 100 feet. Such are the principles on which the most approved type of stable should be built.

The objection to the cubic contents named is that the building would be cold; where this objection holds good there is no reason why artificial warming should not be practised by means of a gas bracket at certain inlets, the products of combustion being carried off from the building, or hot water pipes may be used. The present practice of raising the temperature of the building by the heat radiated from the body and the heated expired air is obviously highly insanitary.

The surroundings of the stable or cow-house need attention, dung pits, uncleansed drains, &c., should be looked to; pits intended for manure should not be nearer than 13 yards to a stable. How often do we not find them placed close to or under the window, the poisonous vapour passing into the building? Care should also be observed not to crowd buildings too close together, and the nearest that one block should approach another is twice the height of the nearest building. Blocks built in the form of a square are bad, especially if close together, the obstruction to free natural ventilation being very great.

In dairies, special provision must be made for rooms for storing the milk, which should be quite distant from the cow-shed or any human habitation.

All drains should be properly trapped, and if sub-soil drainage is introduced into the building all traps should be ventilated, and thus cut off from the sewer.

It may not be possible, owing to the expense of construction and other causes, for private individuals to afford their animals such sanitary dwellings as we have described, but an endeavour should be made to work as near to it as possible.

All receptacles for excreta should be cemented, and the same remark applies to cow-houses for the place where "grains" are stored.

The removal of excreta is an important matter; we are liable to forget that one of the chief causes of air impurity in stables and similar buildings is owing to the presence of fæces and urine, and if for no other reason than this ample ventilation is required. By the use of surface drains the most effectual and sanitary drainage inside the stable is accomplished, and none other should ever be used.

The part played by *Soils* in the production of disease is far from clear; we do certainly know that a high ground water is dangerous to health, that marshes are prolific of sheep rot and anthrax, and that alluvial soils, with dense marls and clays are, especially in the tropics, notoriously unhealthy; but how far such diseases as tuberculosis, glanders, &c., are affected by a polluted soil, we have at present no information. My own impression is that in course of time it will be shown that soils do play a very important part in the production of disease; the whole question needs to be thoroughly investigated, especially in the tropics.

The nature, character, and conditions under which animals perform *Work* is a question which offers the fullest possible scope for hygienic interference. In this country horses are the chief animals used for the purpose of work, but

abroad, and with armies in the field, mules, bullocks, elephants, camels, &c., are severally employed, and require considerable attention.

The nature of the work comprises riding, draught, and pack. In the former, the fitting of saddlery and the prevention of sore backs is a subject on which much might be written; we must here only content ourselves by saying that the question, until recently, has never been scientifically studied, the result being the production of immense injury and loss. We now know that saddle fitting can only be properly carried out when anatomy and the laws of physiology are brought to bear, in showing what part of the back is capable of bearing weight and what parts are not, and in demonstrating the absolute necessity of the saddle conforming to the shape of the horse, and the advantage of distributing the weight over a large rather than a small surface.

The ultimate result of employing these simple rules will mean, to the army in particular, an immense saving of life and suffering in the future.

With pack animals, much the same considerations in saddle fitting apply as to riding horses.

With draught, a great deal needs yet to be done; the best form of vehicle suited to different roads, size of wheels, angle of traction, fitting of collars and other portions of harness, and the relative advantage of shaft *versus* pole draught, are all points influencing considerably not only the value of the work performed, but the comfort and health of the animals called upon to perform it.

The streets of every big city demonstrate daily the necessity of inquiring into this question of draught; horses are compelled to perform their work under unnatural conditions, defective shoeing, slippery roads, and other factors which tend to exhaust their strength and wear them out long before their time.

The regulation of the amount of work to be performed can only be observed where the public is instructed and capable of understanding the elementary fact that a horse is not a machine, and that his muscles need rest and time for repair as well as our own. It is, perhaps, on points of this kind that hygiene may have the least influence; cupidity is strong. Fortunately we are a horse-loving race, and the feelings of the noble animal appear to directly appeal to our senses; but in other countries such does not appear to be the case. The operations of the law give horses a certain amount of protection in respect of the question of overwork, but it is probable that in cities the major part of this cruelty is inflicted at night time.

Individual Hygiene.

Many points of the greatest importance have to be considered under this head, such as stable management, bedding, grooming, clothing, clipping, shoeing, &c.

A good bed for horses is essential; if they lie warm and comfortable it is equivalent to extra food, the limbs are rested, and the horse refreshed. The bedding should receive careful attention in the morning, the whole of it being removed from the stable and the soiled portions replaced, the portion of litter kept should be dried in the sun if possible, but under all circumstances thoroughly aired and ventilated.

The common practice of not removing the bedding from the stable, or turning it under the manger during the day, cannot be too strongly condemned; it is impossible under these circumstances to keep the air of the stable sweet, owing to the amount of ammonia and foul vapour given off from the decomposing litter.

It is considered by some that horses should be bedded down during the day, as it saves the feet; certainly horses like bedding under their feet, but I am not prepared to say that such is essential.

The use of moss litter and sawdust as bedding, with the object of absorbing the urine, is very good if the absorbent material be kept clean; where soiled bedding is allowed to remain the feet are destroyed by being soaked in the alkaline mass produced by the decomposing urine.

In *Grooming*, two objects are aimed at, viz., a clean skin and a glossy coat, a brush suffices for the former; the natural sebaceous secretion which gives the latter is excited by wisping. Grooming is an art which can only be learned by long training; its theory is simple, its application difficult. Washing horses is a pernicious and dangerous practice, dangerous for the reason that they are always left to dry themselves, pernicious because it removes the natural grease from the skin, induces cold, and causes the coat to become dull. A horse covered with dirt should be scraped, the body dried and clothed; if not wet, but simply muddy, the latter should be allowed to dry and then brushed out. Washing legs in winter produces intense erythema of the heels, sometimes reaching as high as the knees and hocks; it is due to using hot water, and not drying the parts.

The skin of the limbs also suffers from the application of salt to the roads in times of snow, the low temperature produced by snow and ice causing the parts to become frozen.

Thus we find the skin suffers from want of grooming, and the limbs from washing and other causes; the amount of damage the latter produces in large cities in the winter can hardly be imagined. Scabies shows itself through neglect in body cleanliness, the disease in the horse spreads with surprising rapidity, and nothing but prompt action can effectually arrest it. I am not clear how far dirt alone produces the disease, or rather affords a nidus for its existence. I have seen bodies of horses systematically neglected in respect of grooming keep free from scabies, and I have known it occur where the best stable management existed; in this case the disease was imported. When, however, we combine dirt with poverty and starvation, at once the disease breaks out in its most virulent form, and in this state is the scourge of armies in the field.

It is a recognised fact that horses living constantly in the open require very little grooming, as it exposes them to cold and skin irritation. The surface of the body should simply be wisped, but both mane and tail require thorough brushing out.

The amount of clothing required by horses depends entirely on the length of the coat and the ventilation of the stable. In cold stables they require more food to keep them in condition, and extra clothing saves this to some extent. On the other hand, the wearing of three or four blankets in the winter is a mistake, as the coat grows thin and fine, and the sudden change from, perhaps, a hot stable to a piercing easterly wind, is the explanation of most of our cases of chest disease. Army horses receive no clothing, no matter how severe the winter, unless they are living in the open. This should be sufficient evidence on a large scale of the comparative immunity of the horse against cold.

Clipping.—The extra growth of hair during the winter causes, with hard-worked horses, continual sweating during work, and in this state more harm is done than it is possible to conceive. Horses with wet skins are left standing in the streets, instead of being quietly walked about, and to this a very large proportion of our cases of pneumonia and pleurisy are attributable. We recognise as a practical fact that if horses are performing severe work in the winter the long coat must be removed, and artificial covering take its place in the stable.

There are certain skin diseases of the legs attributable to long hair, affecting especially the heavier or common breeds. Long hair on the limbs acts as a nidus for dirt, as being coarse and stiff it is difficult to clean. This, no doubt, is one of the explanations of "grease" in the horse. The abundance of hair

grown on the limbs, and so much prized by breeders, is a source of danger, and is no indication of strength as is commonly supposed.

The *Shoe ng* of horses is a most important practical side of veterinary hygiene. Though the most intelligent horse owning race in the world, we are, nevertheless, sadly behind in understanding the principles of an art which contribute so largely to the soundness and comfort of horses.

We cannot here enter into the unprofitable discussion of whether horses could or could not work without shoes, but must at once recognise the practical fact that shoeing is a necessary evil, like many other things the outcome of the domestication of the horse. The object of shoeing is to prevent undue wear of the foot; this protection is given by a rim of iron nailed to the part. In applying this we must bear in mind the physiology of the foot, so as not to interfere with its functions more than we can help, and as nails have to be driven into living structure, we must by care reduce the evil thus produced to the narrowest limit.

The function of the wall of the foot is to bear the weight of the body; the same remark applies to the bars; the use of the sole is to protect the delicate parts inside, and, by its union with the wall, to assist in supporting the weight. The function of the frog is to prevent the horse from slipping; by its physical character, viz., india-rubber nature, it prevents concussion to the foot and limb, and through its position it supports weight, keeps the heels open, and so maintains the proper width of the foot.

The elasticity of horn is obtained by the amount of moisture found in its horn tubes, when they are destroyed the moisture evaporates, and the part becomes dry and brittle. Brittleness occurs when the wall is rasped, as is commonly done in shoeing; it is equivalent to removing the enamel from our nails by scraping.

This bare outline of the physiology of the foot tells us that the shoe should fit the foot, and not the foot the shoe, that it should have a perfectly level bearing on the wall and bars, that the sole should not be touched with the knife, that the functions of the frog are entirely destroyed by allowing the part to be cut away, and that it can only act and grow healthy and strong by resting on the ground. Physiology also tells us that no more nails than are necessary should be placed in the foot, and that the wall should not be rasped on its surface.

The function of the foot does not teach us the pattern of shoe needed. This depends upon the nature of the work, but the simpler in form the better.

So impressed is the public by the necessity of having different shapes and makes of shoes, that they have lost sight entirely of the infinitely more important point—the fitting of the shoe. My own opinion is that providing the shoe conforms with the principles of shoeing here laid down, that the pattern of shoe used is immaterial.

By care and attention to shoeing thousands of pounds worth of property would be saved to the country yearly. There is no greater bane of horseflesh existing at the present time than the incompetent farrier and the ignorant owner. The latter is solely to blame; he leaves the shoeing of his horses in the hands of ignorant and prejudiced servants, and the farrier has to do as directed by them or lose the work. The principles of shoeing can be learned by a child, and I look forward hopefully to the not very distant future when our English horses will be shod on scientific principles, and this only needs the hearty and intelligent co-operation of the educated public.

State Hygiene.

So far I have only attempted a brief consideration of the important factors in the production of diseases which we have shown are largely under our control, and almost entirely in our own hands. I must now draw attention to

the existence of certain diseases which are not so clearly controllable, are capable of inflicting enormous loss, and require prompt and energetic action to cambat them. I allude to the many epizootic diseases affecting horses, cattle, sheep, and pigs in this country.

There are certain epizootic diseases affecting all animals; there are others affecting only certain members of the same class, and others again which only affect animals of the one kind and no others.

Anthrax is a disease affecting nearly all animals, and equally fatal in each. Variola is another affecting nearly the whole animal kingdom, but with different degrees of severity, being exceedingly serious and fatal in the sheep, benign in the horse and cow. Rabies affects all, and is fatal to all. Tuberculosis, common in cattle, rarely attacks sheep, and still more rarely horses. Specific pneumo-enteritis is essentially a disease of the pig, known as swine plague. Cattle plague and pleuro-pneumonia affect horned cattle only. Glanders affects only solipeds, and man through inoculation. Foot-and-mouth disease attacks cattle only. Foot-rot and liver-rot affect only sheep. Influenza and strangles are essentially diseases of the horse.

As a matter of fact, it may be stated that none of these diseases need really exist, most of them can be completely stamped out, some owing to the vitality of the poison are difficult to eradicate, of which the best example is anthrax, but assuming, as we are bound to, that of the purely specific diseases mentioned above non can arise *sui generis*, then the only logical conclusion is that stamping out should rid us of them for ever.

It would be difficult to imagine a country more perfectly suited to the exclusion of disease from foreign sources than the British Islands; it is true that our requirements in foreign cattle are large, and that we draw from notoriously infected countries, or at any rate, from countries which have been affected; still, given the conditions essential to prevent the introduction and spread of epizootic disease, and we find that in this kingdom they exactly exist.

When diseases of a contagious or infectious nature affect animals, there is no reason why, so long as we know the definite conditions under which the poison is spread, that we should not be able to arrest its progress. We have this information for such diseases as anthrax, cattle plague, pleuro-pneumonia, foot-and-mouth disease, variola, foot-rot, glanders-farcy, rabies, tuberculosis. We have not got this information in respect of influenza or strangles. I do not mean it to be understood that the profession is unanimous in its views on these points, but we are pretty clearly agreed that glanders can only affect by contact with the poison, and that simply living under the same roof with a diseased horse will not infect a healthy one which has not come into contact with the diseased patient, and the same remark applies to rabies, anthrax, foot-rot, and foot-and-mouth. These diseases, like mange, require for their propagation actual contact with the poison, though not necessarily with the diseased patient.

Cattle plague, pleuro-pneumonia, variola, and probably tuberculosis, are undoubtedly diseases spread through the medium of the air of infected areas. Healthy animals introduced into sheds occupied by the sick, or into places where affected ones still exist may contract the disease, though no actual contact has occurred.

Influenza and, perhaps, strangles, affect horses quite irrespective of any condition; contact or no contact, infected buildings or otherwise; we have certainly reason for believing that the poison in the former disease may be carried for long distances by the air, and that all susceptible animals are affected by it.

There are thus three distinct classes of epizootic, and the efficient control of these increases in difficulty from I. to III. Class I. can be absolutely

stamped out, as we know exactly the lines on which to limit the spread of the poison, which is a fixed one. Class II. is more difficult, and apparently even slight air infection is sufficient to produce the disease; the poison is both fixed and volatile. In Class III. the poison is probably wholly volatile, and is absolutely not under human control.

The methods to be adopted to rid ourselves of disease will depend in the first instance, as to whether, like foot-rot, foot-and-mouth disease, mange, influenza, strangles, &c., the disease is distinctly curable (*a*); or whether, like anthrax and cattle plague, it presents a high mortality (*b*); or like glanders, rabies, pleuro-pneumonia, and tuberculosis, it is absolutely incurable (*c*); for practical purposes we may class *b* and *c* together, and advise destruction; the number of recoveries in class *b* are small, and do not counterbalance the increased risk attending the keeping alive of such foci of infection.

I have previously stated that theoretically we should be free from animal scourges; the advantages we have over the human hygienist in this respect are enormous, we can destroy the affected, and segregate the sound or exposed. Nothing remains to us but the destruction of all affected in class *b* and *c*, and to a great extent the destruction of all absolutely in contact with the infected; this destruction must include not only taking away the life of the animal, but the destruction of the body, so as once and for all to rid it of producing further harm. Perhaps it is in this latter respect we fail more than any other; we allow, it is true under certain conditions, the utilization of hides, hoofs, horns, and even flesh from the infected, and thus most considerably contribute to the support of the life of the disease-producing organism. Occision should include destruction in its fullest sense. Isolation is the method employed for stamping out the diseases in class *a*, and for completing the measures adopted in classes *b* and *c*.

This isolation must be of the most perfect kind, such as can only be obtained by the assistance of the law; infected places should practically be in a state of siege, though it is clear that such rigorous measures are only necessary when the diseases are such as are undoubtedly conveyed by the movements of animals, and by the attendants on the sick; they must be judged of also by the intensity of the poison.

Depending, again, on the nature of the poison, must such measures as the movements of all animals in the district, holding of fairs, &c., be prohibited; such measures, though extremely productive of public inconvenience, are essential in such diseases as sheep-pox, pleuro-pneumonia, swine plague, glanders, &c., &c.

The theoretical exclusion of disease from this country is obtained by means of our system of port inspection. I am not prepared to say that this latter is not capable of further improvement and extension, but I do say that this enormous work so quietly and unostentatiously carried out is the salvation of our herds; it is impossible to estimate the value of our port inspection; that certain cases must escape detection is inevitable where so many thousands are being inspected, and when we consider the obscure symptoms of some of our most contagious diseases, notably tuberculosis and pleuro-pneumonia.

The value of quarantine is also fully appreciated where stock is landed from suspected countries, and the necessity of destruction at the port of debarkation, though full of inconvenience to the public, is a method of prevention of the greatest possible utility.

The laws regulating the transport of cattle across the country by rail and road appear to meet all requirements; they are not intended to apply to diseased stock, though of necessity, such cases must leak in. The disinfection of railway trucks is an important matter. I am rather inclined to regard the lime-washing as a useless measure when animals labouring under specific diseases have been carried; from a point of cleanliness, it is of course

useful. I consider that railway trucks should be disinfected by means of super-heated steam.

The transport of cattle by sea is a question which has gradually forced itself on the attention of the public. The profession for years has been alive to the cruel condition under which this is usually carried on. Larger air and deck space, better ventilation, specially constructed pens, and greater cleanliness are required. The fittings should as far as possible be of iron to facilitate disinfection, and should be securely fixed. The only real solution of the difficulty is the special construction of ships for cattle traffic, and none others should be employed.

Special Veterinary Hygiene.

To the special branches which fall under the head of veterinary hygiene I have already previously alluded, it is here only my intention of describing one to which, perhaps, increased attention will be paid in this country. I allude to the cultivation of calf lymph for human vaccinations.

It does not fall within my province, nor in a paper of this kind is it desirable, to discuss the relative advantage of humanised and animal lymph. For our purpose it is sufficient to assume that animal lymph is required, and we have, therefore, only to point out in what way and under what conditions this can best be obtained, and endeavour to show that lymph so cultivated produces in the human subject a typical eruption, which we have every reason to believe is as protective as humanised lymph.

Calves are selected as the animals to be worked with, partly on account of their manageable size, but also from their less liability to be infected with such diseases as tuberculosis, and moreover, because it is not impossible that the eruption is more typical, and the yield of lymph larger in the young than in the adult animal.

The most suitable age is found to be between three and six months old; they should he healthy, well nourished, and weaned. This latter is an important point in the sense of economy; the expense of feeding the animals on milk is considerable.

Every animal before being used for cultivation purposes should be kept under observation for some days, and during this time the temperature should be regularly taken morning and evening; this period also enables one to determine whether the diet they are placed on agrees with them, for calves are most liable to a fatal form of diarrhœa from errors in feeding, alteration in diet, and other causes unnecessary to be named.

The most suitable daily diet for a calf of the age mentioned is, hay, 4 lbs.; grains, 2 lbs.; bran, 1 lb.; oil cake, 1 lb.; mangolds, 5 lbs. I believe that on a poor diet the yield of lymph falls off, and that it is economical to feed them liberally if only on this account.

The sanitary conditions under which the animals live are very important to attend to, the surface of the body should be kept clean, and all soiled portions of the skin regularly attended to; they should be fed and watered three or four times a day; the stable in which they are kept must be clean, warm, light, and well ventilated, the drainage surface, walls regularly whitewashed, and impervious; flooring dry, clean, and sweet, and the partition separating one animal from another should be whitewashed two or three times a week. The stalls erected for the calves should be sufficiently wide to allow them to lie down, but not to turn, the object being to prevent them getting at the vaccinated surface and destroying it by licking. The animals must be kept clean; to avoid them getting soiled by lying in their own fæces regular attention is required, and each calf should be allowed 4 lbs. of straw daily as bedding. The warming of the building must be carried out by hot water pipes.

No animal should be used for vaccination purposes which has not been

under observation for at least four days or even longer; during this time the thermometer must be diligently employed both morning and evening, the condition of the bowels should also be noted, and the most careful inspection of the whole surface of the body carried out. Animals affected with ringworm or eczematous looking skin should be rejected.

The vaccination is readily performed; the animal by means of a special table is placed on its side, and the hind legs being separated, the abdomen and inside of both thighs are carefully shaved, washed, and dried. I vaccinate over a large surface, but never carry the insertions below the middle line of the abdomen, as they would only get soiled and destroyed.

The number of insertions are from 30 to 50, depending on the size of the calf; there is no reaction in the system depending upon the area covered, it makes no difference, either to the state of health or to the temperature, whether we make 30 or 50 insertions.

Tne form of scarification is most important. I vaccinate over a square or circle, the diameter of a shilling to a halfpenny, by a series of light diagonal scratches which cross each other. No blood should be drawn; the lymph is then carefully worked in. I allow a few minutes to elapse after the last scarification before the animal is taken off the table.

There are other methods of infecting the surface, namely, by a single slight incision which only passes through the epidermis, or by punctures; both these methods in my opinion are defective, inasmuch as they are wasteful; by the circle or square method three or four times more lymph may be obtained.

There is no rise in temperature for two days; on the third day a marked elevation generally occurs, but the health of the animal is not affected as judged of by the appetite; on the fourth day it is evident that the scarifications are taking as indicated by a red areola round each; on the fifth day the vesicle is surrounded by a silvery areola, outside of which is a narrow red one, the vesicle is yellow in colour, the centre being depressed, darker, and drier than the surrounding parts.

On the fifth day the calf is placed again on the table, and the whole part thoroughly washed. For this purpose I use a hose attached to a tap, and every particle of soiled material is removed; by this time the peculiar characteristics of the vesicle become fully developed. It is remarkable how they come out through washing, a most unpromising looking eruption after a thorough wash turning out a typical one. The surface in being sponged should not be rubbed, or the vesicles are damaged.

It is as well to starve the calf the morning it is required for collection, as owing to the length of time it is on the table the stomach becomes partly paralyzed, fermentative gases collect, and the abdomen becomes distended. This is avoided by starvation.

Operators differ in their views as to the period to be selected for lymph collection. On the Continent the sixth and even the seventh day is selected, whereas, in this country the fifth day is the one generally, and, I think, properly chosen. It is certain that in a small percentage of cases the vesicles on the fifth day are not up to time; these may be allowed another day, but such cases are the exception.

It is necessary that we should be able to carefully discriminate between the vesicle fit for lymph collection and the one which is too far advanced to admit of its being used for vaccination.

The typical vesicle fit for lymph collection has a narrow red areola surrounding the vaccinated surface; the edge of this latter is raised, and quite silvery in appearance; the width of this narrow silvery edge is not more than one-eighth of an inch even in large vesicles; within this the surface of the vesicle ls yellow, darker, and towards the centre depressed; it is, moreover, dry, and if scraped is distinctly firm, separating with

difficulty from the part below. The advanced vesicle is yellower, the red areola much larger, the silvery one disappearing, and the yellow, depressed crust, instead of being adherent, is either separating, or readily separated, exposing a red, ulcerating looking surface below, bathed in pus. Such vesicles must not be used for lymph purposes.

Assuming, therefore, that our vesicles are all that can be desired, the lymph is collected by first strangulating the vesicle with a specially prepared clamp, at first applying the clamp lightly; the surface of the part is then carefully scraped to remove crust and silver areola, and rapidly wiped; the clamp is now tightened, and, if successful, the part is rendered bloodless, or nearly so. The object of not tightening the clamp at once is to prevent forcing out the fluid lymph before the wiping process is finished. The object of lightly scraping the surface and removing the crust is to use nothing which has been in contact with the ground or the air, and the necessity of using a clamp is to keep the lymph bloodless and facilitate work.

Vaccine lymph consists of two distinct parts, viz., a fluid and a solid portion; some calves yield mostly fluid lymph, others yield a comparatively dry solid lymph, and in a third class the solid and fluid is equally distributed. The fluid lymph is the serum of the blood, the solid is the tissue of the pock; both are very virulent.

The first material from a vesicle is a yellow fluid, sometimes blood-stained. After this is removed with a collecting spatula the next thing taken is the soid, pock tissue; this is completely scraped away, and by this time the clamp will require re-tightening; the next to appear is a thin, watery, colourless fluid more like the lymph from the human arm; it exudes from the lymphatics, and I have proved it to be virulent. It is sometimes in great abundance.

My own prejudice is in favour of the solid pock tissue, as it is easier to keep aseptic, and, I think, retains its virulence longer.

By means, then, of the collecting spatula, the whole vesicle is robbed of its fluid and solid lymph, and placed in an agate mortar. Each vesicle is treated in the same way, being unclamped after it is emptied.

The crusts and silver areola belonging to each vesicle are kept separate for the vaccination of the next calf.

The whole of the lymph, which may now weigh 11 grammes, is carefully and in small portions at a time ground up in an agate mortar to a fine emulsion; by this means the fluid and solid material is intimately mixed, and anything like portions of skin can be readily removed, as they impart a lumpy feeling to the pestle which renders their detection easy and simple. After the whole lymph has been treated in this way a preserving agent is added; the best for the purpose is pure glycerine, the amount added depends on circumstances, but it is generally about its own bulk of lymph; the most thorough incorporation of this mixture now takes place, and it is then placed in tinted tubes 1½ inches long by ¼ inch diameter, corks are inserted, and the whole sealed by dipping carefully in melted paraffin; this is now kept as stock, and protected from the light and heat.

When small quantities of lymph are required, say for 10 to 25 people, the necessary amount is placed between squares of glass, plain or hollow, and the edges of these are dipped in melted paraffin and so sealed; this is a rapid and most convenient method of issuing lymph, and gives the operator the least trouble. The glasses are protected from light by being folded in tinfoil. When lymph for 100 persons is required, one of the tinted tubes above described is sent, as these hold sufficient for 100 vaccinations.

Other methods of preserving and issuing lymph may be adopted, such, for example, as ivory points and capillary tubes, but I can say little for these, for the reason that the ivory point is wasteful, and some time is occupied in dissolving the lymph; moreover, the dried lymph does not maintain its vitality

for much more than two months, and in the summer not for longer than six weeks. If points are charged no glycerine is added to the lymph.

Capillary tubes may be filled direct from the vesicle; such lymph is very difficult to expel from the tube owing to coagulation, and the process is wasteful; moreover, the lymph soon gets cloudy and unfit for use. Lymph diluted with glycerine and water may readily be introduced into the tubes after the grinding process described, and this is the most successful of the tube methods, as much of the solid pock tissue also finds its way in and increases the virulence of the fluid. Personally, I unhesitatingly prefer the method of issuing between glass plates.

Calf lymph is always slightly tinged with blood. The method by which it is collected accounts for this; the tint is quite unobjectionable, and free from danger so far as we are at present aware.

There can be no doubt that part of the regular system of an animal vaccine establishment should be the destruction of the vaccinifer, and post|mortem examination of the body; by this means we could completely control the issue of lymph by destroying all that derived from a diseased animal. The percentage of calves affected with tuberculosis appears, from continental experience, to be something infinitessimal; whether the disease amongst English calves is as low I am not in a position to say.

The vitality of calf lymph is an important practical question. There is no doubt that its life is a short one, and that on the human subject it begins to fall off at the second month, and at three months is almost inoperative; strange to say, however, it retains its virulence for calves for a much longer period, and I have successfully vaccinated calves with lymph 14 months old. I cannot explain this difference, but it is undoubted.

During hot weather lymph should be kept in a refrigerator, and under all circumstances it must be kept in the dark.

A very important practical point to consider is the extent to which dilution of the original lymph may be carried on by means of water and glycerine, and on this point I am prepared to speak with exactitude.

The idea in this country is that the lymph should be issued on points and nothing added to it, that by adding anything an opening is allowed for septic organism, &c., and moreover the proportion of lymph to dilutent is so small that failures occur. This view is not correct; no septic organism will flourish in glycerine, and the fact is lost sight of that the water used to dissolve the dried lymph on points may be and is teeming with organisms, which are thus readily introduced on to an abraded surface.

The vaccine organism can live for a long time in glycerine, so much so that at one time I thought it probable glycerine extracted the poison; experiments made to prove this failed, but it is certain that where thorough incorporation has taken place, that glycerine containing only a minute proportion of vaccine gives successful results.

Experiments made to determine the amount of dilution to which lymph can be exposed showed that when there was only one part of lymph to five parts of glycerine, as good results were obtained as when lymph alone was used; even when the lymph formed but one-sixth part of the vaccinating fluid good results were obtained.

The disadvantage of highly diluted lymph is that it cannot be neatly sent between glass plates.

It is no uncommon thing after the use of calf lymph, no matter how prepared, for the arms on the eighth day after vaccination to present a highly inflamed appearance, the limb being swollen and the erythema extending as low as the elbow and as high as the axilla, the part being abruptly defined from the surrounding skin. The lymph is often blamed, and it may be responsible, but such conditions occur principally in adults, and generally in those persons not

remarkable for body cleanliness; I attribute the trouble to infection from soiled linen and dirty skin, and using instead of resting the arms; exactly the same lymph used on infants produces no such erysipelatous eruption, the explanation being that they are kept cleaner and cannot scratch the part. I have never seen any cause for anxiety in such cases; the redness disappears in a day or two, leaving some œdema which gradually falls through the length of the limb, invading forearm, wrist, and hand.

I have seen several cases in adults where swelling and redness of the arms have occurred without a suspicion of body cleanliness being defective; such cases are probably due to using the arms, or irritation from rubbing, but as these results do not appear to occur with humanised lymph it is possible the calf lymph alone may be to blame.

The amount of lymph yielded by each calf, after having undergone the process previously described, varies considerably; I have obtained from one calf sufficient for the vaccination of 4,500 people; the smallest yield supplied material for 752 people, and I generally count on getting sufficient for 2,000 vaccinations from each animal.

The virulence of this lymph is certain, for out of 37,274 primary and re-vaccinations performed in 1890, there were only 2,927 failures.

Other details are essential in carrying out this responsible work; a careful thermometric record of each animal, and description of each should be kept from the day it enters the establishment. The yield of lymph and its distribution shall also be noted in order that no difficulty may be experienced in tracing the source of each supply sent out, which should in every case bear the number of the calf and date of collection. These details inspire confidence, and are not to be neglected.

Conclusion.

The last point I have to deal with, is a consideration of the system employed in this country for the instruction of the future members of the veterinary profession in the principle of sanitary science. We have endeavoured to demonstrate the many ways in which veterinary hygiene may assist the State, the public and private owner, and have given good reasons for believing that the welfare of our valuable horses and cattle depends entirely on the intelligence exhibited by those responsible for their watering, feeding, stables, ventilation, drainage, grooming, shoeing, etc., etc., but what measures do we take to ensure the instruction of the profession in these essentials?

I am sorry to say that the Royal College of Veterinary Surgeons requires no instruction to be given in veterinary hygiene; the students are not examined on the subject, and are obviously not taught. This short-sighted policy in a college, which has decidedly attempted to raise the standard of veterinary education in this country is greatly to be deplored, especially as such comparatively unimportant collateral sciences as bacteriology and botany are fully dealt with. A man with a smattering of bacteriology is, scientifically speaking, a dangerous person, and the time devoted to the study of these collateral sciences, which can only be successfully employed by specialists, would, if directed to the study of theoretical and practical hygiene, make the future practitioner a stronger and more useful man.

I trust this Congress will assist those of us anxious to impress the Royal College of Veterinary Surgeons with the importance of introducing hygiene into our schools, by supporting a resolution which will be framed in the summary of this paper.

The vital statistics of animals we know nothing about, excepting in the army and some large companies. It is rather difficult to believe that we, the most wealthy horse owning country in the world, have no idea how many

horses there are in Britain! Need I say, after this, that we have no knowledge of the births or deaths.

The returns furnished by the Agricultural Department of the Privy Council only deal with agricultural horses. I trust a horse census will be one of those things of the near future, and that this Congress represents to Her Majesty's Government the necessity of having some knowledge of the horse population of the kingdom.

CIVIC HONOURS FOR THE VETERINARY PROFESSION.

It is very gratifying to find that, in the late election of Mayors, our profession has shared in the civic honour and distinction conferred by the citizens of the corporate towns and cities who have the privilege of selecting from among their number gentlemen to fill the highest office it is in their power to bestow.

Mr. James F. Simpson, F.R.C.V.S., and J.P., was unanimously elected Mayor of Maidenhead; while the same honour fell to the lot of Mr. W. Penhale, F.R.C.V.S., who is now Mayor of Barnstaple.

We beg to offer them our heartiest congratulations on receiving this well-deserved proof of the esteem and confidence of their townsmen, and we trust their year of office may be a happy and a prosperous one. Their elevation lends lustre to the profession to which they belong.

THE EGYPTIAN SANITARY DEPARTMENT.

The Khedive of Egypt has recently decorated several officials of the Sanitary Department, and we are very pleased to find in the list the name of Mr. Littlewood, M.R.C.V.S., who has received the Third Class of the Medjidich, which he has well merited, he having done excellent work in his department since his arrival in the land of the Pharaohs.

INSPECTORS OF THE AGRICULTURAL DEPARTMENT.

Promotion runs quickly among the inspectors of the Agricultural Department. We learn that Mr. Haygarth Brown, the barrister-at-law, Mr. Francis A. Fulford, farmer and land-agent, and Mr. A. W. Anstruther, farmer and land-agent, who have hitherto been temporary officers under the Pleuro-pneumonia Act, now, says the *Mark Lane Express*, thanks to the appreciation of Mr. Chaplin, ascend to the higher position of permanent travelling inspectors of the Board of Agriculture.

Reviews.

SPECIAL REPORT ON DISEASES OF THE HORSE. (Washington: 1890.)

If the position of veterinary surgeons in the United States, and especially in the Army, is not yet what we should like to see it, there can be no doubt that veterinary medicine and surgery are making rapid strides in that great country, and that the Government is doing much to extend a knowledge of these subjects, especially among agriculturists and the public generally. To attain this object more effectively, it issues reports and books on diseases of animals, these being written by competent veterinarians, and no expense is spared in making them as thorough as is possible for popular guides. Among those books which have already appeared, this on diseases of the horse is perhaps the best, as it is the most complete and instructive on the subject of which it treats; indeed, we do not know of any work on the horse intended for non-medical horsemen to be compared with it, and there are few veterinary

works which surpass it. That this should be so, might be inferred from the names of the writers of the different sections into which the work is divided; for we find them to be among the highest veterinary authorities on the American Continent—as Michener, Law, Harbaugh, Trumbower, Liautard, Holcombe, Hindekoper, and Dickson are familiar names to those who have watched wlth deep interest the rapid evolution of veterinary science among our other-selves across the Atlantic. And when it is mentioned that the book has been produced under the supervision of the talented and able chief of the Bureau of Animal Industry at Washington, Dr. Salmon, there is a guarantee that nothing is wanting to render it worthy of the Government Department of Agriculture, and of its Secretary, to whose foresight and enterprise his countrymen are largely indebted for this and similar treatises. There are fourteen sections in the book, and these include pretty well everything relating to the diseases of the horse that horsemen require to know, written in an agreeable and attractive style, and capitally illustrated with beautiful plates. Some of the sections are, of course, better than the others, but all are on a high level, and, altogether, the treatise is one which will be of great utility, not only in America, but in every country into which it may find its way. It is certainly well worthy of perusal by veterinary surgeons in this country, if only for the novelty and freshness with which well-known topics are dealt with.

PRECIS DE THERAPEUTIQUE, DE MATIERE MEDICALE, ET DE PHARMACIE VETERINAIRES. BY P. CAGNY. (Paris: J. B. Baillière et Fils, 1892.)

High and unstinted praise must be unhesitatingly awarded to the text-book which M. Cagny, President of the Central Society of Veterinary Medicine, Paris, and Honorary Associate of the Royal College of Veterinary Surgeons, has courteously forwarded to us for notice. It is essentially a guide to veterinary surgeons in the art of curing the diseases of animals, dealing, as it does, concisely, scientifically, and most thoroughly with general therapeutics, veterinary materia medica, special therapeutics, and applied therapeutics. Mention is also made of the physiological and therapeutical effects of medicaments, their action on the different organic systems, and also treats of asepsis and antisepsis, terminating with a brief description of animal disorders and their treatment. The book, in fact, is a perfect *vade mecum* of information, much of it derived from the author's own personal experience. The arrangement is that which is generally considered most convenient in a work of this kind, being alphabetical, and numerous wood-cuts assist in illustrating the subjects which Cagny describes with the pen of a skilled writer and most proficient veterinarian. We know of no work on the subject equal to this in matter, while its portable size and typography will render reference to it easy and prompt. Such a work would be of great value in the English language, and we congratulate, with a slight tinge of envy, our French colleagues, on the most useful and creditable addition which Cagny has made to their extensive literature.

Army Veterinary Department.

We have much pleasure in announcing that, on November 17th, Veterinary-Captain E. E. Bennett was called to the Bar as a Fellow of the Honourable Society of Lincoln's Inn. This officer has most praiseworthily employed his spare hours in improving his knowledge, usefulness and social position in various ways, and within the last few years he has obtained the diploma of the Royal Agricultural Society of England and the Fellowship of the Royal College of Veterinary Surgeons. The Army Veterinary Department, like the Agricultural Department of the Privy Council, now possesses a Barrister, the difference being, however, in favour of the former, as its law representative is qualified to act as a veterinary authority, while that of the latter is not.

The *Bombay Government Gazette* of October 8th, notifies that Veterinary-Surgeon S. M. Smith is appointed Lecturer in Veterinary subjects to the Agricultural Class of the College of Science, Poona. It is also intimated that First Class Veterinary Surgeon J. K. Grainger, Superintendent, Horse-Breeding Operations, Bombay Presidency, is allowed furlough in India and to Europe for two years.

The Government of India have addressed a despatch to the Secretary of State on the general question of horse-breeding operations and remounts. They have decided that the number of young stock to be purchased yearly shall not exceed seven hundred, all being over eighteen months old.

Mr. J. H. B. Hallen, General Superintendent, Horse Breeding Operations, has been granted one year's extension, with effect from the 21st July last. The question of a further extension will be considered next July.

The introduction of the Station Veterinary Hospital system into the Madras Presidency has been sanctioned.

It is probable that a Bacteriological Laboratory will be started at the Lahore Veterinary College.

The old, old story—we had almost said the convenient fiction—of the final scheme for the establishment of a Civil Veterinary Department in India, is reported as having been sent to the Secretary of State. Every province will be equipped with a veterinary officer, or officers selected from the military cadre for organisation of measures to educate natives in veterinary science, to deal with cattle disease, and to facilitate and extend horse-breeding operations. For this last purpose the officers of the present Horse-Breeding Department will be incorporated in the Civil Veterinary Department. The total number of officers required is eighteen, of whom ten are already at work in some of the provinces. Eight new officers have been applied for to strengthen the military cadre, as the latter has to supply a similar number to the new department. Mr. Hallen will be in charge of the civil veterinary operations so long as he remains in the country. The provinces most affected will be Bengal and the N.W.P. In the former there is now no veterinary officer at all.

In the notice in the last journal, of the new designations for Army Veterinary Surgeons, the regret was expressed that the designation of the Department itself had not been altered to Veterinary Staff, in order to complete the resemblance between it and the Medical Staff; and in expressing this regret allusion was made to the desirability for this change, as the term "department" is that commonly in use in stores and outfitters' business. There was no intention—there could not be any—to institute a comparison between it and these establishments. But it should be explained that, for many years, complaints have been made of the designation by veterinary officers, because it is one so often employed in mercantile houses: and, with a view of removing these complaints, application was made not long ago to have "staff" substituted for "department." The authorities, however, would not sanction the change. The same plea was urged by medical officers for altering the designation of their department, and their request was acceded to: it is now Medical Staff.

In expressing our gratification with the beneficial change in the title of the Veterinary Officer—which at once marks his function and his rank—we are still of opinion that "staff" is preferable to "department," for the reason stated, and it is to be hoped that the alteration may be effected at no distant day.

Obituary.

THE following deaths have been reported:—

James Anderson, M.R.C.V.S., Glasgow, Graduated 1867-1879.

William Barnes, M.R.C.V.S., Whitchurch, Salop, Graduated 1875.

Proceedings of the Royal College of Veterinary Surgeons and Veterinary Medical Societies, etc.

GLASGOW VETERINARY COLLEGE.

Opening of the Session.

The introductory lecture of the forthcoming session of the Glasgow Veterinary College was delivered on the 21st ult., at the College, Buccleuch Street, by R. P. Wright, Esq., F.H.A.S., Professor of Agriculture, Glasgow.

Principal McCall occupied the chair, and there were also present Professors Cooke, Limont, J. McI. McCall, and King; Revs. David Watson, of Woodside, and A. Scott, of Bargeddie; Messrs. Burnet, M.R.C.V.S., Mabole; Blue, M.R.C.V.S., Glasgow; Kerr, M.R.C.V.S., Dalry; Peddie, M.R.C.V.S., Cathcart; Forbes, M.R.C.V.S., Glasgow; Dr. Ryder, U.S.A.; Mr. Gilchrist, James Borrowmare, M.R.C.V.S., Cupar, &c.

The following address on "Examinations" was delivered by R. P. Wright, Esq.:

Gentlemen,—It is my first duty to-day to offer my thanks to the Principal of this College for the honour he has done me in inviting me to deliver the introductory lecture of the session. In accepting the invitation, which I have done with great pleasure, I am merely discharging an old debt; for when I opened my first class in agriculture in this city some years ago it was Professor McCall who introduced me to my first students, and who then began the first of those acts of consideration and kindness which it is his nature to show on all fitting occasions. But, apart from personal considerations, I have seized with gratification the opportunity afforded me of connecting myself, even for a day, with an Institution that boasts such an honourable record as belongs to this College. Its history contains an inspiration to all of us; and I doubt if those of you who are now about to begin a prolonged course of study will have from all your classes a more valuable lesson than is to be derived from the contemplation of that history. It is thirty years ago since Professor McCall, then an unknown young practitioner, lectured through a whole winter session to his first class of three students, and now this College is everywhere known as one of the most successful in the kingdom; its attendance of students averages about 120, and last year, as you are aware, its Principal was accorded the highest honour that it is in the power of the veterinary profession to bestow—in being elected President of the Royal College of Veterinary Surgeons. That is what may be achieved by the proper exercise of such high qualities of character and capacity as are possessed by Professor McCall; and it forms an example, gentlemen, which, rightly considered and rightly applied, may be of more value to you than the learning you will acquire during your whole course of study at this College. And now, gentlemen, I turn to the consideration of a subject that is always of deep interest to teachers and to students, viz. that of examinations; and I propose to discuss that subject with special reference to certain aspects of it that are of importance both to agricultural and to veterinary students. It has already on several occasions formed a topic for discussion, both in the agricultural and the veterinary worlds; but there is still room for further consideration. It is a subject of the greatest importance to veterinary students, because an examination forms the gateway through which they must pass to it has not the same vital interest, for to those there be who approach that entrance who never pass through. To the majority of agricultural students the practice of their profession; and many of them who purpose devoting

themselves to the practice of farming the knowledge they acquire is of much more value to them than the diploma which merely certifies its possession. To all teachers the subject is of the first importance, because the credit and the reputation of a teacher depend largely on the success of his students, and apart from that consideration there is no teacher worthy of the name who does not take a warm interest in the progress of the young men for whose education he is in part responsible.

First of all, then, it is necessary to take note of the object for which examinations are instituted. Examinations are held primarily for the purpose of ascertaining the knowledge and capacity of the student; and in certain circumstances the test is applied merely in order that the deserving student may receive some public recognition and reward for his meritorious work. In other cases the examinations are held rather for the protection of the public, and they afford a guarantee that the successful candidates possess sufficient qualifications for the proper practice of their profession. In all cases the examination tests in some measure also the proficiency of the teacher. In the ordinary examinations in Board Schools, for example, for which payment on results is obtained, the visit of the inspector and the report on the examination, are commonly regarded as tests of the efficiency of the teacher quite as much as of the progress made by the children. In the examinations for the ordinary degree of Master of Arts in the Universities, or in the examinations in agriculture of the Royal Agricultural Society or the Highland Society, seek merely the honour of passing, and are satisfied with the public proof of ability and acquirement. But in the medical examinations of the Universities, and in the examinations of the Veterinary Colleges, the consideration which must overweigh all others is the protection of the public.

The examiners for medical or veterinary diplomas have to do their duty to the teachers and to the students, but they have above all to discharge a public duty. Their position is one of responsibility, and they owe it alike to their own sense of justice and to those who have entrusted them with such powers, that they allow no candidates to succeed who have not in their judgment acquired such competence as will enable them to treat with sufficient skill all common diseases in man or in the lower animals.

Examinations may, therefore, be regarded from three points of view: from that of the student, from that of the teacher, and from that of the public; and in the recognition of the fact that there are three interests involved lies the solution of all the difficulties attendant on the question of the proper methods to be adopted in examination. No method, in my opinion, can be satisfactory in which these several interests are not fully represented and guarded.

Let us see how examinations are actually conducted for the veterinary and agricultural diplomas, and how the methods adopted affect these various interests. In the examinations of the Royal College of Veterinary Surgeons twenty gentlemen are employed. No veterinary teachers or professors are allowed to take any part in the examination, and the duties are at present entrusted to five lecturers from institutions other than veterinary, and to fifteen veterinary practitioners who are not teachers. There are two points of great importance raised by the constitution of this body of examiners. The first is the total exclusion of teachers, and the second is the immense preponderance of practical men—so-called—on the Board. (I use throughout the terms "practical men" and "teachers" to make a convenient distinction, but I decline to regard as a satisfactory teacher or examiner, either in agricultural or veterinary science, one who is not practical.) In agricultural circles the opinion has been expressed also, in some quarters, that the practical element ought to be more largely represented in the examinations for agriculture for the Highland Society's diploma, and that practical men rather than teachers should set and value the written papers; and therefore, both to veterinary

and agricultural students, the question of the true functions to be assigned to practical men in examinations is one of present interest.

The object aimed at in the employment of practical examiners is certainly commendable. It is well to impose some safeguard against the instruction being made too purely theoretical. It is every way desirable that the training of students should be as far as possible practical, and that they should be filled with the kind of knowledge that will be of direct use to them in life. In the absence of ladies, we will all agree that a young lady who has learned to cook, to sew, and to darn, has done more to fit herself for the proper discharge of domestic duties than if she had learned to speak French, and to play on the piano and violin. In the same way it is well to ensure that the instruction given to students should be fitted to be of really practical use. But that result appears to me to be very well secured by the plan that has been hitherto followed by the Highland Society. In their examination in agriculture the teacher sets the written paper and values the answers, while the practical examiners conduct the oral examination. The result depends, first of all and properly, on the written paper; but the oral examination ensures the detection of any candidate whose acquaintance with the subject is of a purely theoretical character, and no one ought to be able to pass who has not a competent knowledge.

But if it be contended that practical men, either in farming or in veterinary practice, or in any other department of learning, ought to set the written papers and examine them, then I say frankly that in my opinion they are not competent to do so. I speak generally; of course there are doubtless exceptions, and I speak with all due respect for their ability; and I do not doubt that there may be practising in the ranks of all professions abler and better men than those who are teaching. I do not know how it stands in the veterinary profession. I know very well that there are many men among the rank and file of our farmers who have been much more richly endowed with natural gifts than any that now fill the Chairs of Agriculture in Scotland; and had circumstances so ordered it, they could no doubt have made more successful professors than the present occupants of these seats of honour, but not of ease. But, nevertheless, I hold for several reasons that practical men are not qualified to set written papers and to adjudge on them, and that teachers ought to be employed to do so, both in the agricultural and the veterinary examinations.

In the first place, the knowledge of practical men is, as a rule, confined in too narrow a groove to fit them to be examiners. It is the inevitable tendency of practice to reduce the volume of knowledge to what is absolutely necessary to meet the exigencies of every-day life in a limited sphere. Whatever may have been at one time known that has not been found serviceable in daily life becomes quickly forgotten. Within its own limits the knowledge of the practical man is minute and precise, but its range lies within boundaries too narrow for the adequate examination of a student. And if the practical man knows thoroughly and accurately what he has to do with in his daily practice he is apt at the same time to become too positive and dogmatic, and he is incapable of risking sufficient allowance for circumstances and conditions that may have a real existence, though they do not happen to have fallen within the scope of his own observation. The practice of teaching, on the other hand, has certainly the effect of opening the mind to take a comprehensive view of all the parts and aspects of a science. The teacher has to go over his whole subject year by year, and of necessity he touches sections of it that may very rarely come under the notice of a practitioner, and he is necessarily familiar, as the practitioner cannot be, with many directions and details on which a student ought to be examined. There are here to-day a number of gentlemen who are accustomed to write and to speak in public every day of

their lives. In the use of the English language thay may be called thoroughly practical men, for it is their daily business to use it. But how many of them are there who would be competent to become for one day in the year inspectors of schools, and to take up two classes of boys in standards five and six, to examine them thoroughly on English grammar and syntax. I doubt if there be one who would be willing to attempt it. In all professions the range, and in some respects the accuracy, of the knowledge possessed by the practitioners of an art become distinctly less than what is held by the teacher. In the medical profession, who would think that the country doctor would make as good an examiner as the eminent gentlemen who are at once its ablest practitioners and its most distinguished teachers? In precisely the same position do you stand in the veterinary profession, and the regulations as to examiners, by which I find that there are five examiners who are teachers, and fifteen examiners who are practitioners but not teachers, are in my judgment based on an entirely erroneous idea of the qualifications required.

But there is another reason why practitioners do not make the best examiners. Progress in all departments of learning is being made at present at such a rapid rate that it is difficult even for a teacher to keep himself abreast of all the advances that are being made, while to the practical man, engrossed in his daily business and immersed in many cases, it is simply impossible. As a matter of fact, most men as they arrive at a certain age become unwilling, as they are often unable, to assimilate new ideas and to adopt new discoveries. Men in practical life become so wedded to long-established customs and practices that they will not readily change them for new and improved methods. But the teacher of a science, by the very nature of his work, is led to seek for and to welcome all new discoveries, and it is his bounden duty to send out his students into the world equipped with the latest and best knowledge that his time affords. But when the old-fashioned practitioner, grounded in the faith of his obsolete practice, confronts the student who comes before him full of youthful enthusiasm for the latest methods, it is not surprising that the result should be often so unsatisfactory.

There remains, however, a better reason than any yet given why written examinations should be entrusted to teachers rather than to practical men. The examination of students is itself an art, and like any other art it cannot be efficiently none without practice. The mere setting of questions is not without difficulty. Even experienced examiners sometimes set questions that can only be understood by students trained in their own classes, and that are quite unintelligible to students educated by other professors. More difficult still than the setting of the papers is the task of assigning a correct value to the answers. Not only is it necessary to know the subject, but insight, judgment, and skill are required in order to arrive at a right decision either from written or oral answers on the capacity and acquirements of a student. I hold the strong conviction that teachers are the only capable examiners, because they have in their class work the regular and constant practice in examining students that is as essential to perfection in this as in any other art. Just as the horse-dealer is the best judge of horses and the cattle-dealer of bullocks, so does the teacher become the shrewdest judge of students. No inherent capacity can fully atone for the want of the requisite training and experience. To excel in the examination of students requires special skill, special knowledge, special practice, and these are only to be found combined in a teacher. Inasmuch, therefore, as the veterinary examination is conducted by examiners of whom only five out of twenty are engaged in teaching, I do not hesitate to offer an emphatic opinion that the system is wholly erroneous in principle, and that it can never be expected to operate with fairness and success either to students or their instructors.

But though I contend that the sole charge of examinations should not be

entrusted to practical men, I by no means urge that they should be wholly excluded from examinations. In that respect the method of examination followed for many years by the Highland Society in the examinations for its diploma in agriculture appears to me to be a very admirable one. In that examination the papers are set by a Professor of Agriculture, and the answers are valued by him, and no doubt the result of the examination depends chiefly and rightly on the written paper. The oral examination of the students is then conducted by practical farmers, and it is sufficient to show whether the student has any real acquaintance with the subject or whether he has simply succeeded in writing a good paper by sheer force of cramming. The written examination tests the fulness, the completeness, and the accuracy of the student's knowledge; the oral examination discovers whether that knowledge is real, and whether the candidate is familiar with farming operations, and it prevents the passing of any one whose acquaintance with farming is purely theoretical. So far, that is a model method of examination which places the functions of the teaching and the practical examiner in their true relation, and secures the utmost fairness and efficiency in the examination.

But if teachers are to be examiners, the question arises whether they ought to be permitted to examine their own students. One reply only is possible. In the public interest it is essential that all examinations for diplomas should be conducted by independent examiners, as is done in the examinations for your veterinary diploma. But the opposite practice is very common. The examiners for art and science degrees in our universities are all the teachers of the students they examine, and up till now the power of custom and of self interest have sufficed to perpetrate this unfortunate practice. So far as the interests of the students are concerned it is a very satisfactory system, for they cannot have better chances of passing than when they are examined by their own teachers with whose special idiosyncrasies they are always well acquainted. In one sense also the system is advantageous to the teachers, because they can pass a sufficient proportion of their own students, and because, if the examination be open to students of various colleges, the teacher who conducts the examinations is likely to attract the most students. But, nevertheless, the examination of his own students is always an unpleasant duty to a teacher, for he cannot feel altogether irresponsible for the failure of students whose training has been entrusted to himself.

On the whole, the system of the examination of students by their own teachers must be condemned on the one ground, that it fails to offer any safeguard to the public interest; that it presents no adequate barrier to the success of insufficiently qualified candidates, and that it affords no test of the merit of the instruction given. The teacher is left free from control or restraint except in so far as these are supplied by his own conscience and judgment, and the one may be very elastic, and the other very weak. This question has been repeatedly discussed in connection with the diploma examination of the Highland Society; and last spring the matter was formally brought under the notice of the Society by letters from Professor McCall and myself. Up till a few years ago, when classes of agriculture were first opened in the Technical College in this city, students could not prepare themselves for the Highland Society's examination by studying anywhere else in Scotland save in Edinburgh; and if the system of examining by their own instructors was open to objection, it was at least not unfavourable to the candidates for the diploma. But when students trained in Glasgow were sent forward to these examinations, it became clear that the conduct of the examinations operated unfairly against us in two ways. It made it more difficult for our students to pass the examination than for Edinburgh students trained under the examiners. This result had a tendency to diminish the reputation of the Glasgow classes, and it certainly had an effect in attracting students to

Edinburgh who might otherwise have found it more convenient, or might have preferred to take this course of study in Glasgow. It was obvious that a society that was national and not local, that was supported by contributions from all parts of Scotland, and drew its membership from all its counties, was not entitled to accord a preference to any one teaching institution over another, but was bound to treat all with equal impartiality. As soon as the matter was fairly and formally brought before them, the directors promptly decided to obey the dictates of equity, and to have the examinations in future so conducted that equal justice should be dealt to all interested institutions.

We have seen that the public interest is secured by the method of independent examination, but we have not yet considered how this system affects the candidates and their teachers. On the whole, it is a fair method to students, but it has one or two disadvantages. In the first place, the result of one or more years' work is tested solely by a single examination, conducted by an examiner, who is wholly ignorant of the general character and ability of the candidate. Very meritorious and competent candidates sometimes fail to pass a final examination through nervous excitement, disturbance to the health, or other accidental circumstance; and, on the other hand, very indifferent students by some freak of fortune occasionally pass with flying colours. It will occasionally happen that a very indifferent student will be examined on the only things he happens to know, while a well-read and well-informed student may be examined on the very parts of the subject with which he is least familiar. In class examinations frequently repeated the effects of such accidental variations do not affect the final result, and the best man always comes to the front. An outside examiner, however, can only judge by a single examination, and he can make no allowance for a temporary failure, whereas it is probable that his teacher, knowing the ordinary merit of the candidate, would be disposed to judge him rather by the general average of his work than by the result of the one examination.

Another difficulty about independent examinations is that questions are frequently put which students cannot understand. I have already referred to this as an objection to the employment of practical examiners. But even professional teachers and examiners often set questions in such a manner that students well acquainted with the subject are quite at a loss to know what the examiner wants. Every examiner asks questions from his own point of view, and that may be a very strange one to students trained under another teacher. Some examiners appear to think it their duty to mislead the students, and deliberately draw up papers of questions that are really puzzles, and the difficulty is not in the answering of the question, but in knowing what answer is wanted. That is, in my opinion, an essentially false view of the duty of an examiner. It is his business to discover the extent and the accuracy of a student's knowledge, and he has no right to ask other than plain, intelligible, straightforward questions, whose meaning is perfectly clear. A student has plenty of difficulties to face without having this one thrust in his way. But there is still another difficulty, and a more serious one, connected with independent examinations. In every science there are disputed questions, and high authority may be quoted in favour of very diverse views. Every teacher naturally and rightly seeks to impress on his own students the belief that he himself holds. But if the examiner holds a contrary view, and if he choose to regard the difference of opinion as a vital error, the student who comes before him is wholly without defence, and it is commonly believed that students frequently fail to pass examinations for this reason and no other.

On this matter it seems to me that the duty of examiners is perfectly clear. As far as possible they should avoid asking questions on disputed topics, or the questions should be so framed that the point of difficulty need not be

touched. But as a matter of fact, questions are, and will continue to be, set on disputed points. Practical men are the greatest offenders in this respect, because their choice of subjects is smaller, and because their attention will have been most closely directed to a subject that has been widely discussed. Unfortunately, also, it is the unhappy tendency of human nature alike in politics, in religion, and in science, to form the most decided and the most intolerant beliefs on those very subjects on which there exists most room for a genuine and honest difference of opinion. If the disputed point must be touched, there remains then one plain duty for the examiner. He is bound to accept any view correctly stated by the student, provided it is a view that is held by any recognised authority in the profession. He has no right to refuse a pass because the student expresses an opinion different from his own. Students are not supposed to form original opinions till they have left college. All they can be expected to do is to understand, and be able to state intelligently and practise correctly, what they have been taught, and if their views be wrong the teacher may be censured, but the students are blameless, and it is a grave injustice to make them bear the penalty.

It would seem then that even the method of independent examination is not without its drawbacks, and it may be asked whether a perfect system is attainable. I shall briefly describe a method that seems to me to fulfil pretty well all the required conditions.

1. Examinations should be both written and oral. That is the method almost universally followed, and it is the best.

2. The written examinations ought to be conducted by independent examiners, and they ought to be teachers of the subject and accustomed to examination work.

3. In the written papers a greater number of questions ought to be set than the student is required to answer.

This is the practice followed by the Science and Art Department, and it allows a proper margin for variation in the teaching and for variety in the individual aptitude and liking for certain sections of a subject. It gives a certain wholesome freedom to teachers, and prevents their being tied down with absolute and crushing rigidity to a prescribed course. It is a plan that ought to be more commonly adopted in open examinations.

4. The oral examination ought to be conducted by the same examiners, but they should be assisted by practical examiners to whom the major duty of conducting this part of the examination should be assigned.

5. The teachers of the students ought to be present during both the oral and the written examinations, and they should have the right to ask that an explanation be given of any question in the examination that appears to them obscure, and should also have the right of altering the form of questions in the oral examination that are not put with sufficient clearness.

These regulations dispose, I think, of all the objections that can be taken to the method of independent examination. If the questions are obscure the teacher is there to demand an explanation, and if the views or the methods are condemned the teacher is there to hear the condemnation. The written examination is efficient because it is conducted by independent and experienced teachers; the oral examination is efficient because it is conducted by practical experts; the interests of the student and his teacher are protected by the presence of the latter, and the public right in a fair and a thorough examination is secured by the appointment of the independent examiners. Thus all interests affected are adequately protected, and the necessary conditions of a fair examination appear to be fully attained.

I have, to-day, gentlemen, directed your attention to some difficulties and defects of our present systems of examination; but let me assure you in closing that, under any system, the unattentive, the idle, and the dissolute

student will certainly fail. Your future lies not in the hands of examiners, but in your own; and let me remind you that success, not only in this College but in the great school of life in which Providence has placed us, belongs to the honest, the industrious, and the God-fearing.

At the conclusion of the address the medals and certificates were presented to the successful students of last session.

OPENING OF THE NEW VETERINARY COLLEGE, EDINBURGH.

The winter session at the New Veterinary College, Leith Walk, was opened on Wednesday, 7th October, in presence of a very large gathering of Ladies Students, and members of the veterinary profession from all parts of the country, among those present being: Mrs. Rutherford, Mrs. Woods, Mrs. Hunter, Mrs. Bowhill, Mrs. Hazelton, Mrs. Spreull, Miss Burton, Miss Thompson, Misses Macadam, Miss Flint and Mrs. Owen Williams, etc. Messrs. J. Hope, D. Young, J. Park, T. Skirving, R. Gray, J. Mackitchie, T. M. Horsburgh, C. Campbell, M. Macgregor, J. Gray, F. Gibson, Captain Wilson, Captain Baird, Dr. Moir, J. Skinner, Captain Bruce, J. Bryden, W. Cuddie, R. Croall, etc. R. Rutherford, F.R.C.V.S.; W. Woods, F.R.C.V.S.; A. Spreull, F.R.C.V.S.; W. Pallin, M.R.C.V.S.; J. Young, M.R.C.V.S.; R. Reid, M.R.C.V.S.; J. R. Brown, M.R.C.V.S.; J. Clark, F.R.C.V.S.; W. D. Connochie, M.R.C.V.S.; T. D. Connochie, M.R.C.V.S.; W. D. Bannatyne, M.R.C.V.S.; A. McArthur, M.R.C.V.S.; A. W. Lawson, M.R.C.V.S.; J. Lindsay, M.R.C.V.S.; G. Scoon, M.R.C.V.S.; J. Borthwick, M.R.C.V.S.; H. Thompson, M.R.C.V.S.; J. Aitken, M.R.C.V.S.; F. Dun, F.R.C.V.S.; J. C. Johnston, M.R.C.V.S.; R. Bell, M.R.C.V.S.; J. Sandeman, M.R.C.V.S.; F. Whittaker, M.R.C.V.S.; A. F. Durkie, M.R.C.V.S., etc.

The Earl of Lauderdale was to have presided on the occasion, but his Lordship wrote at the last moment that he would be unable to fulfil his intention of being present at the opening ceremony, owing to a severe attack of illness. In the absence of his Lordship, Professor Williams proposed that Dr. Stevenson Macadam should take the chair, remarking that if they had been disappointed at not having a peer of the realm to preside, they had a peer of chemistry, and one of the oldest teachers in connection with veterinary science in the city of Edinburgh.

On taking the chair, Dr. STEVENSON MACADAM said that he esteemed it a high honour to be asked to preside over the meeting, when the introductory address was to be delivered by Principal Williams. During a lengthened professional career, he (the Chairman) had been intimately associated with the teaching staff of the Veterinary College in Edinburgh. Indeed, it was now forty-three years ago when, associated with another gentleman now present, Mr. Finlay Dun, he had been assistant with the late Professor George Wilson, who at that time lectured in Chemistry to the veterinary students in Edinburgh. Ever since then he (the Chairman) had been connected with veterinary teaching, either directly, as Professor, or as now, as Emeritus Professor of Chemistry in the New Veterinary College, where in the active staff, his son, Professor Iveson Macadam, perpetuated the name in the list of active workers. His (Chairman's) services in veterinary science were not, therefore, of yesterday. Those present at the meeting, and especially the students, might congratulate themselves in assembling under the roof of this splendidly equipped college, with its spacious and well-ventilated class-rooms, its airy dissecting-rooms and chemical laboratories; its well-furnished museums; its well-patronized forges; its infirmary, with all appliances for the treatment of diseases among the lower animals, and, above all, for its staff of eminent and efficient Professors, associated with able assistants and

officials in all departments. Indeed, the New Veterinary College of Edinburgh might fairly be regarded as the best teaching Veterinary College in the Kingdom. For all the splendid buildings and appointments, and for the major part of the success which had progressively attended the College, they were indebted to the never-failing pluck, the indomitable energy and the steady perseverance of their distinguished head, Principal Williams, whom, after some letters of apology for non-attendance had been notified, he would call upon to deliver his introductory address.

At the outset the Professor said that, as this was the centenary of the profession as a scientific order in Great Britain, he had thought it his duty to relate very briefly a history of its foundation in 1791. The London Veterinary College was instituted in that year by M. St. Bel, at the instigation of the Odiham Society for the improvement of agriculture, who appointed a committee to confer with M. St. Bel as to the advisability of founding some such institution for the improvement of farriery and the proper treatment of cattle and horses. But previous to that period, many works had been written upon veterinary matters and the general management of stock, and at the commencement of his own professional career the traditions of the older writers were still adhered to, and absurd prescriptions were believed in as being infallible in the treatment of ailing stock; in fact, previous to, and for a long time after, the advent of M. St. Bel, the great aim of the practitioners of the art seemed to be to convince the public that each of them possessed the true and only cure of disease. All their attention was directed to the cure, and not to the prevention of disease, or the removal of its causes. Amongst the old writers, Downing, who in 1797 published a treatise on the disorders of horned cattle; Bracken who in 1740 wrote a book called *Farriery Improved, or a Compact Treatise on the Art of Farriery;* Gibson, a surgeon, who in 1745 wrote a treatise on the diseases of the horse; Wm. Griffiths, who in 1795 wrote a practical treatise on farriery; and the Earl of Pembroke, who wrote a military equitation, giving receipts for the cure of diseases—stood out prominently: but the majority of all these writers seemed to be ignorant of the nature of diseases, their causes and prevention; in fact they were men of recipes, and although many were medical men, they had but little knowledge of anatomy, physiology, or the allied sciences. Glanders, farcy, ophthalmia were rampant, and diseases of cattle were too little studied. Hence the loss of animal life was great, and it was not, therefore, to be wondered at that the Odiham Society turned its attention to the better understanding of veterinary science. The negotiations which were entered into with M. S. Bel were brought to a successful issue, and the London Veterinary College was formally instituted in the early part of May, 1791, with M. St. Bel as Professor. The President was the Duke of Northumberland, while the Vice-Presidents were Lords Grosvenor, Morton, Oxford, Rivers, etc. Things went on to the satisfaction of all concerned till 4th August, 1793, when M. St. Bel, the Professor, was seized with a fatal illness and died. After his death, the Professorship was given to Coleman, assisted by Moorecroft; but the latter, evidently a practical man, shortly retired and became eminent in India. Coleman was a very accomplished man, and one who saw pretty well before him. He paid great attention to sanitation and the prevention ot diseases, and his work in this direction soon manifested itself in the case of such diseases as glanders and ophthalmia, and, against the prevailing opinion, he recommended fresh air in the treatment of inflammation of the lungs. He also wrote on the foot and shoeing; but, like his predecessors and contemporaries, he taught that the foot was expansive upon its solar aspect, and hence his great efforts was to maintain this power of expansion, and by barbarous methods prevent the condition termed contraction. Coleman was succeeded by Sewell, and all they now knew of him was that he recommended frog seton in navicular

disease, and the performance of the excision of the nerve in chronic foot lameness. The former operation was now seldom or ever performed. Then they had as writers and teachers, Spooner, Dick, Blaine, Percivall, and Youatt. Of all the works of Blaine one could not speak too highly. He was a good anatomist and physiologist, but, like his predecessors, was attached to the heroic methods of treatment. About this period they found that men began to deviate from the treatment of the past in the attempt to cure disease, and to resort to much more active remedies. Bleeding, physicking and blistering were now brought into operation. The old farriers knew little or nothing about the theory of counter-irritation, nor of the effects of such remedies as calomel, opium, digitalis, etc.; and it was not until the days of Percivall that such measures were brought to bear upon internal diseases. Percivall recommended bleeding, even thrice within eighteen hours, in the case of inflammation of the lungs. This practice prevailed for many years. When he (Professor Williams) commenced to study the profession, and during his studentship under Dick, bleeding, counter-irritation, and the remedies he had mentioned, were invariably prescribed. Seeing that treatment by bleeding was unsuccessful, some practitioners, following the example of Dr. Todd, who prescribed stimulants in the case of the human subject, condemned bleeding and depressants, and adopted treatment by stimulants, a practice which, he was sorry to say, prevailed to this day, and the result of which was proved to be no better than its converse during the outbreak of the last epizootic amongst horses in this country. If anyone liked to take the trouble to trace the progress of that disease, they would find, both in Scotland and in England, that in towns and other places where stimulants and other drastic measures were most extensively employed, the mortality was greatest. Medicine was not yet an exact science, but it was now laid on a better foundation. The nature of the disease and its symptoms were being more considered, and the treatment modified accordingly. The Professor then pointed out that great progress had also been made in surgery, mainly owing to the discoveries of Lister, and, in conclusion, addressed the students on the importance of the duties that lay before them. They of the present generation, had, he said, the benefit of both the mistakes and the great truths of the past. They had also the advantages of very different methods of working, of the microscope, of the lantern, and of photography. All these gave them a true idea of the structure both of normal and pathological tissues. But even with these appliances, they, their teachers, only hoped to lead them to work and to think for themselves, for without work nothing could be obtained. In the words of Emerson, "No matter what their work was, let it be theirs." No matter if they were a tinker or teacher, blacksmith or president, let what they were doing be organic, let it be in their bones, and they opened the door by which the affluence of heaven and earth would flow into them.

After Principal Williams delivered his address, the CHAIRMAN (Dr. Stevenson Macadam) said that they had now listened to a most interesting and instructive address, giving the salient points in the history of veterinary teaching during the last century, being practically the lifetime of veterinary science. The successive steps whereby any science is evolved from darkness into light, and any practical art passes from chance or rule-of-thumb work to intelligent treatment, may at times amuse us, as we from our firmer footing look back to the unmade tracks of knowledge of previous times; but we must never forget that the earlier workers had to grope somewhat in the dark for their science and their practice, and thus we have fallen heir to their successes, whilst at the same time we are warned by their failures. All sciences have passed through a dark age. Chemistry in the alchemical days, and astronomy in the astrological times, were very crude and fanciful in many ways; but we must never forget, amid all the mystery and sometimes quackery

of these periods, that modern chemistry owes a vast deal to the labours of the alchemists, and that the astronomy of the day is based largely on the midnight workings of the poetic astrologers. In the same way, the veterinary science and practice of a century ago, and within that time, might not appear to us as very intelligent; but upon their failures, as well as their successes, modern veterinary treatment has been largely based—eliminating the useful from the dross, and yielding a more exact, humane and successful treatment for all animals.

THE CENTRAL VETERINARY MEDICAL SOCIETY.

An Ordinary General Meeting was held at the Holborn Restaurant, on November 5th, 1891. The following Fellows of the Society were present: Veterinary-Lieut.-Col. Duck, Professors Pritchard, Penberthy, Shave, Veterinary-Major Kettle, Veterinary-Capt. F. Raymond, Veterinary-Capt. F. Smith, Messrs. W. F. Barrett, J. H. Browne, M. Clarke, H. W. Caton, T. Chesterman, J. A. W. Dollar, H. D. Gibbings, A. E. Gostling, C. J. Humphreys, G. Lansley, W. J. Mulvey, G. H. Pickwell, W. Roots, J. E. Rickards, J. Rowe, A. Rogerson, H. G. Rogers, F. Samson, S. Villar.

Amongst the visitors were Veterinary-Colonel J. D. Lambert, Prof. Bayne, Mr. W. Wilson, Mr. A. W. Hill, Mr. W. C. Wacher and Mr. W. Wingham. Mr. W. Roots, the President, was in the chair.

Telegrams were received from Messrs. Wragg, Wheatley, W. Hunting and Hurndall, regretting that they could not attend, also from the Hon. Treasurer, Mr. J. Woodger, who was prevented from being present by a serious family illness, also from Mr. C. Sheather, who had suffered a recent bereavement. Mr. Roots, the President, delivered the following inaugural address:—

Gentlemen,—At the commencement of my address, allow me to thank you for your kindness in unanimously electing me your President for the ensuing year; a position in which it shall be my earnest endeavour to emulate my predecessors in office. My efforts, however, will be of no avail unless I have your hearty co-operation; but I feel assured it will be accorded to me, and I therefore enter upon my duties with some confidence and much hope. When the time comes for me to vacate this position I trust the records of the Society will at least show that we have kept up the number of its members and tried to do as good work as those who have gone before.

To the Secretaries of these Societies it generally falls to bear the burden of the work, and I am thankful to know that in Mr. Rogers I have a colleague who will spare no pains to make our meetings as successful as hitherto.

The Royal Veterinary College has just celebrated its Centenary, amidst such an attendance of rank and intellect as never before assembled within its walls. From a small beginning, one hundred years ago, it has gone on developing, until now it can boast of every facility for treating the diseases of all the domestic animals. When our first school opened its doors for students, one Professor and an assistant were the whole teaching staff, and the horse the only animal to which attention was directed; in course of time, teachers of Anatomy and Chemistry were added, and later, the ox, sheep, pig and dog were added to the subjects taught. The small acquaintance with allied sciences which once sufficed has given way to a demand for a very thorough knowledge of Chemistry, Physiology and Botany; even the new science of Bacteriology is now taught practically.

The effect of all this teaching is shown by our different methods of practice. Bleeding was the great weapon against disease; and blood was taken freely from animals whether suffering from injury, fever or inflammation of special organs. This is all changed, and the improvement in the rate of mortality amongst our patients is due, no doubt, in a great measure to their better

sanitary surroundings; but also, in no small degree, to the conservative line of treatment now adopted. Perhaps, however, our greatest triumph has been in the measures we have advised for preventing the contagious diseases of animals. The time is not long past when contagious diseases were believed to arise spontaneously, and to be carried in some volatile form through the atmosphere; these two theories implied the impossibility of stamping out the plagues which brought ruin upon stock owners. Separation of diseased from healthy animals on an infected place was all that was done; when once it was recognised that contagion was not volatile, and that the great epizootic diseases could not arise spontaneously, we were able to look forward with confidence to their extinction. Laws were made for that purpose, and they have done wonderful work. Cattle-plague was stamped out; foot and mouth disease has disappeared; small-pox in sheep has ceased its destructive outbreaks; rabies is temporarily suppressed whenever it appears in a district; pleuro-pneumonia is yielding to the well-advised action of the Board of Agriculture. It must not be forgotten that these results are due primarily to Veterinarians, not to Statesmen and Agriculturists; but in London, glanders and farcy has ,defied all our efforts; although the disease is not seen so frequently as formerly, still, the outbreaks are very numerous; and I am of opinion that other measures will have to be adopted to exterminate these terrible diseases, say in the direction of compensation for compulsory slaughter of the diseased animals. I always think we have not had as much public recognition of our services as we deserve; let us, however, be grateful. The State and the public have recognised our profession. Honours have fallen upon many of our members, who have received from the State titles and distinctions. Of social recognition, too, we have had our share. The diploma marks a professional man and a gentleman.

Great as has been the progress made by our profession socially and otherwise, it will not do for us to rest satisfied; we must look forward hopefully to greater triumphs, and remember that as our position was won by the intelligence and industry of our predecessors, so we must continue to strive to hold and improve it. Everyone to us plays a part for good or evil; and, when we meet in bodies like this Society, our actions affect us with even greater force.

And this brings me back from the profession generally to our own Society in particular; this Centenary year of English Veterinary Science marks the coming of age of the Central Veterinary Medical Society. It is twenty-one years since Mr. George Armitage and others founded this Society, and I think we may claim to be as active and sound now that we have reached maturity, as ever we were in our juvenile time. Our numbers have largely increased. Many of our old members have ceased to attend, some have passed away from us for ever. Much as we regret their loss, there is consolation in the fact that young men have joined us. A Society such as this must always feel the loss of practitioners whom long experience has supplied with corrected observation, and a vast store of clinical facts, but without change we should stagnate, and as older men give way to younger we ensure energy and progress. Veterinary Science now-a-days presents a much wider field for contemplation and study than it possessed even twenty years ago. Through the medical papers, and our own periodicals, we are kept informed of all the latest observations and theories noted all over the world. For all new theories nothing is better than the critical consideration to which they are here submitted; discussion is a great step towards ascertaining the truth; and our debates, so long as they are conducted with fairness and good nature, are quite as essential to progress as the production of papers or the relation of cases. I might here remark, in passing, that the Council has decided to change the place of meeting; in future we shall meet as in bygone

times at 10, Red Lion Square ; I trust the change will be appreciated by the Fellows of the Society and that our meetings will be even more numerously attended than they have been at the First Avenue Hotel.

Our Society is a comparatively rich one, a fact we owe to the contributions of the members in the past and the care with which our resources have been husbanded. We cannot be accused of any miserly spirit ; we have assisted to embellish our College in Red Lion Square by presenting it with two stained glass windows ; we have contributed towards the formation of a prize fund which may hereafter provide means for encouraging original research ; we have subscribed liberally to the Steel Memorial Fund, not only to mark our respect for an old member of this Society ; but with a hope that the memorial will be a lasting encouragement to honest work, and we have attempted to resuscitate the art of dissection by offering a small sum to induce some competition amongst students.

Whether we do good or not we can truthfully say that we try to do so, and I have no doubt that the work of this Society is altogether a good work, and one which is almost as beneficial to the Profession as it is to its members. We look back with satisfaction, and forward with hope and determination.

The address was much applauded, and a vote of thanks moved by Mr. MULVEY, and seconded by Veterinary-Capt. RAYMOND was enthusiastically carried.

The company then adjourned for the Annual Dinner ; thirty-five being present.

Presentation to Mr. Villar.

The presentation of the Testimonial to Mr. Sidney Villar, the late Hon. Secretary, was made by the President, who drew attention to the great indebtedness of the Society to Mr. Villar, for the very efficient way he had for so long carried out the duties of the secretaryship. Mr. Villar in a very pleasantly expressed speech acknowledged his appreciation of the gift, and elicited from the company a very hearty and prolonged applause.

H. G. ROGERS, *Hon. Sec.*

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

At the Monthly Council Meeting, held on November 4th,

The Hon. CECIL T. PARKER said that various letters as to liver fluke in sheep had been received ; and, as Professor Simonds's pamphlet on "The Rot in Sheep" had long been out of print, the Committee recommended that inquiries should be referred to the articles on the subject which have from time to time appeared in the Society's Journal. For the Horse-Shoeing Competition at the Warwick Meeting next year, the Committee recommended that prizes be offered as follows :—

	£	£	£	£	£
Class 1 (Roadsters) ..	6	4	3	2	1
Class 2 (Dray-horses) ..	6	4	3	2	1

The competition to be limited to shoeing-smiths in the Society's District F, consisting of the counties of Gloucester, Hereford, Monmouth, Salop, Stafford, Warwick and of South Wales. The Committee had discussed and settled the detailed regulations and times of the competitions, and recommended that they should be incorporated in the prize-sheet as usual. They did not propose the continuance of a class for the exhibition of systems of horse-shoeing not in common use. A letter has been received from Sir Joseph Lister, President of the British Institute of Preventive Medicine, inviting the Council to nominate a representative upon the Council of the Institute. The Committee recommended that the President of the Society

for the time being be appointed a Member of the Council of the British Institute of Preventive Medicine, in accordance with No. 8 of the Institute's Articles of Association. The Committee gave notice that at their next meeting they would ask for a grant of £600 for the coming year, of which £500 to be given to the Royal Veterinary College, and £100 to be reserved for general purposes.

Professor BROWN had presented the following report:—

PLEURO-PNEUMONIA.—During the eight weeks ended October 24th, there were sixteen fresh outbreaks of this disease in Great Britain, barely one-fifth of the number in the corresponding period of last year. These sixteen outbreaks occurred in the counties of Hants, London, Middlesex, Surrey and York (West Riding), in England, and Midlothian in Scotland; eighty-two cattle affected with the disease and 876 healthy cattle which had been exposed to the risk of infection were slaughtered by order of the Board of Agriculture. Besides the cattle slaughtered in these genuine outbreaks of the disease, thirty-seven suspected animals were slaughtered and found free from pleuro-pneumonia, but affected with other diseases. In Ireland, during the eight weeks, there were nineteen outbreaks; twenty-two cattle affected with the disease, 762 healthy cattle in contact, and eleven suspected cattle were slaughtered.

ANTHRAX.—There were thirty-three outbreaks of anthrax reported in Great Britain in the eight weeks; they occurred in the counties of Cumberland, Derby, Gloucester, Lancaster, Leicester, Lincoln (Holland), Notts, Somerset, Sussex (East), Warwick, Wilts and York (West Riding) in England; and Aberdeen, Banff, Kircudbright, Linlithgow and Perth, in Scotland. In these outbreaks, forty-one animals were attacked, three diseased animals were killed, thirty-three died, and one recovered.

SWINE FEVER.—There were 793 fresh outbreaks of swine fever reported in Great Britain during the eight weeks; 4,556 swine were attacked, 1,757 diseased pigs were killed, 2,027 died, 618 recovered, and 564 remained alive when the last published return was made up.

RABIES.—Only five cases of this disease were reported in eight weeks; they occurred in the counties of Essex, Herts, Lancaster and Surrey.

ABORTION IN CATTLE.—On the subject of abortion several inquiries have been undertaken in different parts of the country. In some cases the unsanitary conditions of the farm have afforded an explanation of the occurrence of abortion; but generally there have not been any circumstances to which special importance could be attached as possible causes. In one instance only the history of the herd supported M. Nocard's theory of the contagious character of the disorder. The subject will form part of the next annual report from the Royal Veterinary College.

LIVER FLUKE IN SHEEP, &C.—Liver rot, or fluke disease, has existed in some districts since the heavy rainfall, but the time has passed for any extensive outbreak of the disease to occur. It may, however, be well to advise flockmasters to take the precaution to supply sheep, especially breeding ewes, with artificial food mixed with salt, a sprinkling of which over each ration will be grateful to the animals, and may to some extent arrest the invasion of the parasites. Investigations in reference to the origin of the lung worm, and also as to the contagious nature of foot-rot in sheep, have been continued during the year, and will be dealt with in the annual report of the College.

Mr. DENT hoped that Professor Brown would have been there that morning, because he had asked him yesterday whether he would favour them with information as to the result of the year's work with regard to pleuro-pneumonia. He understood that a report was about to be forwarded to the Irish Government, containing these particulars and figures, and he was

anxious to know whether this report—or, at any rate, the figures contained in it—was to be made public. The report of the Veterinary Department for 1890 did not come out until September, and then it contained the proceedings for only four months of last year. No doubt he could obtain an idea of the figures, by hunting up the monthly reports which had been presented to the Veterinary Committee; but he had hoped that they might have had the particulars that day. He trusted that pressure would be brought to bear to obtain for the Society the Report that was going to be presented to the Irish Government. It was only fair to the public and to men, who, like himself, did not exactly agree with the policy of the Board, that the figures relating to the slaughter of animals should be made known.

He was sorry to find that the veterinary professors and the veterinary surgeons were not inclined to go into this question of abortion in cattle, They said that everything was known about it. He could not believe that everything was known either of this disease or of any other. A friend of his had had something like sixteen cases of abortion in a small herd. He thought the veterinary professors ought to show a little more interest in a subject which was of so much importance to the agricultural community. He was not at all satisfied with the suggestions they made on the subject.

Colonel CURTIS-HAYWARD said he quite agreed with Mr. Dent as to the subject of abortion. He thought they knew very little about it. Some interesting experiments had been tried in the part of the country in which he lived (Gloucestershire), in which he had asked for all cases of abortion to be reported to him. He found that at one farm at which abortion occurred, the whole of the herd was disposed of, and a fresh lot of animals were brought upon the farm, notwithstanding which abortion again occurred upon that farm. It was found that, previously, there had never been abortion upon the farm until it was unlet for about a year, when cattle were allowed in on tack. During that time animals aborted. That seemed to lead to the idea that abortion got upon the herbage. He did not believe that it was ergot, yet it appeared to get upon the herbage in some way or other. It was generally considered that to get rid of abortion one must get rid of the whole herd. But here was a case in which the whole herd was disposed of, and yet abortion again appeared in the fresh herd.

Mr. A. J. SMITH asked whether the same bull was used for both herds?

Colonel CURTIS-HAYWARD: No, the herd was entirely changed.

NATIONAL VETERINARY ASSOCIATION.

DONCASTER MEETING, HELD JULY 21ST, 1891.

Professor Axe, President, in the Chair.

Present: Dr. Fleming; Professors McFadyean, Macquean, McCall, Walley, and Williams; Messrs. W. Hunting, A. W. Mason, G. E. Bowman, J. S. Carter, H. Thompson, B. Smith, R. Roberts, P. Deighton, W. J. Mulvey, F. L. Gooch, M. Hedley, T. Campbell, R. Hughes, T. A. Rudkin, B. Russell, B. Cartledge, F. W. Wragg, W. W. Norwood, R. C. Trigger, J. M. Axe, T. C. Toop, S. Wharam, J. J. Ridley, J. E. Scriven, W. Longhurst, E. Faulkner, W. Awde, C. Hartley, C. Hunting, T. Runciman, W. Woods, H. Olver, W. G. B. Dickinson, C. M. Seeley, H. Howse, W. Carless, J. McGavin, R. Hickes, B. L. Glover, G. G. Mayor, B. Freer, W. Anderson, R. Rutherford, J. Abson, J. Armstrong, J. B. Wolstenholme, T. Hopkin, J. Nettleton, John Bell, R. Thompson, J. T. Thompson, J. McKinna, Jas. Atcherley, H. Inson, T. Bonhill, J. Malcolm, etc.

Apologies for non-attendance were received from Sir Henry Simpson; Professors Penberthy, Pritchard, and Mettan; Messrs. H. Kidd, J. Preston, T. Greaves, T. Burrall, W. Dale, A. H. Darwell, Jas. Smith, J. Hoole, W. Penhale, H. J. Dawes, A. Broad, J. Donald, H. Collett, J. F. Simpson, John Cameron, A. J. MacCullum, W. Wilson, C. Stephenson, G. Elphick, J. P. S. Walker, J. Burnett, A. W. Wheatley, G. Banham, A. Leather, etc.

The PRESIDENT: At the request of the Council I wrote to several noblemen whose presence we hoped to secure to-day at our meeting, and likewise at our dinner. I regret to say we have not succeeded. The Duke of Portland writes to say that he regrets extremely that he is unable to accept our invitation owing to another engagement. I have also letters from several other noblemen and gentlemen who are unable to attend owing to other engagements. The first thing is to approve and adopt the Minutes of the last General Meeting.

The Minutes were adopted.

The PRESIDENT: The next thing is to receive the Secretary's Report. I believe that the Report has also been furnished to each member of the Association. Perhaps you will be disposed to adopt the same course and take it as read.

The Report was taken as read.

In this report it is stated that "the Treasurer regrets that notwithstanding this appeal 113 Members are still in arrear. But what seems even more surprising is the fact that even officials of the Society at present actually owe three or four years' subscription. Many members simply ignore all communications, disdaining to reply either to the circular or to a personal letter from the Secretary sent to all those in arrears. The Secretary is of opinion that the remissness of many is not unconnected with a lack of interest in the programme of the Association, and he would earnestly urge the desirability of at once taking steps to put into effect the resolution above referred to, to initiate original research in some branch of veterinary science. The immediate formation of a Committee, and the commencement of the experiment at as early a date as possible, would very probably furnish much-needed stimulus, and present to members whose interest in the Society may at the moment be somewhat limited some visible and practical *quid pro quo* for their subscription."

Five guineas were subscribed towards the International Congress on Hygiene and Demography.

The PRESIDENT: We shall now be happy to hear any observations upon the Report.

Prof. WALLEY: There is one matter in connection with this Report, namely, the publication of the papers and transactions of the Society in the journals. I take it that in most Societies of this kind the papers and so on are held as the private property of the Association, and they are not published for the behoof of any other than those who are members of the Association. I think, further, that the publication of these papers rather tends to stop men from joining us as members, because they say, "What is the use of joining the Association when we can get all the papers and discussions in the public prints?" I think this is a question that ought to be taken up and considered, whether we are wise in allowing the papers and other transactions to be published in their original form. In some societies, for instance the British Medical, the writers of papers are asked to furnish an abstract, and it is simply the abstract that is published in most instances. I think that is quite sufficient as far as non-members are concerned. I merely throw out the hint as one worthy of our consideration.

Mr. MCGAVIN: I endorse what Prof. Walley has said with regard to publishing our papers. It does not impress gentlemen with the necessity of joining the Society, and the excuse they give is that they can get all that is going on in the Society in the journals, so that it is no use their becoming members.

Prof. WALLEY: I should like the Report to appear in the professional journals, but it should be furnished by the Association.

The PRESIDENT: There are two aspects of every question, and I believe there are two aspects of this one. It might from an economical or a financial standpoint be desirable that we should keep the proceedings and transactions to ourselves, but the aim and object of the Association is to promote the advancement of veterinary science. That is a liberal view of the question, and I apprehend we all wish to be liberal in matters of education. If that be our object, then I question whether it would be desirable altogether to suppress information which arises out of our proceedings from the profession generally. It may be, as has been suggested, that many members of our profession will not join our ranks because they have an opportunity of reading the proceedings or transactions of the Society. That is a selfish kind of view to take of it, and I think we can very well dispense with the members who think in that way, and we may hope, by taking the more generous view, to win, at any rate, those who do not move in a selfish sphere. I think it is not selfish men we want; we want liberal-minded men, willing to work and to help on the cause we have in view. I do not, perhaps, go quite so far as to say that all our proceedings and transactions should be laid open to the whole profession, but I think we should give them a liberal epitome of our proceedings. Of course there are other things to be considered—whether it is desirable to keep the proceedings to ourselves, or whether we should order their universal publication.

Dr. FLEMING: I must agree with you in what you say. I think the object of this Association was to improve our profession. If you make your Association a close one, and do not allow the profession to know what you are doing, I do not know why we exist at all as an Association. I question if those men who do not join the Association, now that you publish your Reports, will join if you do not publish them. The more universally you can diffuse the subjects which you discuss here, the more likely you are to succeed in inducing men to join us. I think it is most advisable that our work should be amply and well reported, so that the profession and the public may see what we are doing.

Capt. RUSSELL: Perhaps there is one point which tends to prevent members of the profession from joining this Association which will be more important than that which has been brought forward by Prof. Walley—I refer to the invitation which, I believe, has usually been sent heretofore to members of the profession generally to attend these meetings.

Mr. MALCOLM: I do not think invitations have been usually sent to members of the profession, but they have been largely sent to members in the neighbourhood of the town in which we hold our meeting to join us as members. All members within a radius of 50 miles have been invited to become members, and to attend this meeting. There has been no general invitation to the profession.

Mr. TRIGGER: I fully endorse the remarks that have fallen from Dr. Fleming. I think it is to be regretted that many members of the profession who read the reports do not profit thereby and become members. I believe that the publicity of these reports will tend to produce a better spirit in the profession, and induce them to join us. They will, at least, think that this is really a good Society and is doing good work, and if they entertain the proper spirit, I think they will like to become members. I think if you once get gentlemen here and let them see the good work that is being done you will go a very long way towards increasing the strength of the Society. I move that the Report be adopted and printed.

The PRESIDENT: The question would be as to whether the proceedings shall be made immediately public, or whether the Association shall keep them as its own property.

Mr. TRIGGER: My resolution would be that they should be published as before.

Mr. E. FAULKNER: I do not see how we, as a profession, are to progress if we narrow our borders, but I can see that we must, if we would advance with the times, extend and spread abroad the fact that we are going with the times, that we are progressing; and one of the most important ways to do that, I think, is not only by means of our own professional journals, but by means of the public press. I feel perfectly satisfied that if we begin to narrow down instead of extend we shall suffer for it.

Mr. TRIGGER: I move that the proceedings be printed and published as heretofore.

Mr. FAULKNER: I second it.

The resolution was agreed to.

Prof. MCFADYEAN: I should like to ask what the motion really means. Does it imply that the Secretary has anything to do with the publication of the Report in the journals? If it is to be published as before, I understand that to mean simply that the transactions be published and issued to the members.

Mr. BELL: May I ask whether the Secretary has hitherto furnished a report to the journals at the cost of the Association?

Prof. MCFADYEAN: I can answer that question in the negative. If it is intended that in future the Secretary is to send a report of these proceedings to each journal, he has not hitherto done that, and I do not think it desirable that he should. I think the journals are quite able to look after themselves in that matter.

Mr. MALCOLM: I think the simplest thing is to leave the matter as it is; all the different papers are represented on this Society. The editors get the papers by right, as members of the Society, and you can scarcely keep them from printing papers that they have got.

The Finances.

Mr. F. W. WRAGG (Treasurer): I will state in a few words the financial state of the Association at the present month. The Report says that we have at the date of publication 113 members in arrear. I am very pleased to announce that through the indefatigable exertions of Mr. Malcolm, our Secretary we have reduced that number by 63, which leaves 50 members who are in arrear. The balance, as you will see, was £119 5s. 11d. Since the publication of the Report we have received £79 13s., which leaves a balance in my hands of £198 18s. 11d. I should have been very glad if this amount had come to me before the publication of the Report, as I should then have been able to have made a further investment in Consols, in addition to the £200 we already have, but immediately that I can get some idea of what the expense of this meeting will be, I shall invest a further amount in Consols, and I hope, if the President and Secretary are not too extravagant, that amount will be £150.

Mr. MALCOLM: I think the better way would be, instead of investing £150 in Consols, to spend it in doing some scientific work. Then members, instead of withdrawing from the Society, would join us, because they would think they would receive something for their subscriptions in addition to the present General Meeting that we have once a year. I think that will be better than investing it in Consols. I am afraid while the Consols add to our income by a small amount of interest, that unless we take some other steps our numbers are likely to dwindle away, and the Society will die a natural death. I think it might be well if a Committee were formed to take the matter in hand, and then something practical might be done.

Mr. BELL: I will suggest that the Council take the matter into consideration, as to whether a certain sum of money be set aside as a nucleus for this object. I thought this year a larger sum would have been voted by the Council, so that we might really get to work. I will move the adoption of the Report.

Mr. WRAGG: I will second that, and I should like to say I am not anxious to retain the money. If any good can be done with it, if it could be better used than by keeping it in Consols, no one will be more pleased than myself. I am anxious to get rid of as much of it as is in my hands as soon as I possibly can, so that it should be doing something.

Dr. FLEMING: I think the next thing we have to do is to appoint an Investigation Committee. If the matter is left to the meeting, we only meet once a year, and the work will not be done. I think a small Committee should be appointed, to decide as to the matters which are to be investigated, and if the meeting thinks fit to empower that Investigation Committee to proceed, the subjects for investigation might be fixed by that small Committee. I think the sooner we get to work the better. The Association has been in existence nine or ten years, and we have done nothing yet. I propose that a small Committee be appointed to define the subjects which are to be investigated, and, if necessary, to select subjects for investigation.

The PRESIDENT: It has been proposed that the Secretary's Report be adopted.

The motion for the adoption of the Report was then agreed to.

The PRESIDENT: The next business is to elect the President of the Association.

Prof. WALLEY: I have very great pleasure in proposing as President for next year our friend Professor McCall. I think I need say nothing in support of this proposition. Most of you know him as well as I do, and I am quite sure he will make an excellent President, and his being President will do good to the Association. I move that Professor McCall be elected President for the ensuing year.

Mr. BELL seconded the motion, which was agreed to.

Prof. MCCALL: I rise to thank you very sincerely for the honour you have conferred upon me in electing me President for the ensuing year. I have been very glad to hear the suggestion to promote experimental research. I hope in entering upon my duties when the time comes, I shall be entrusted with some power, at all events to see that some original work is done. I am perfectly sure that if we do some good work—and I see no reason why we should not—that we shall not require to beat about for members, we shall have the members rallying round the Society as they ought to do. Still, looking back on the past, although good work has been done, I think that unless we do something vigorous we cannot expect members to turn up at these annual gatherings. It is with me almost a question if it is for the good of the Society that we should have these annual meetings. If we are able to carry on some good original work, then I should say it will be for the advantage of the Society that we should meet annually; but if we do not do some work, I think we should have a larger attendance if the Society met every second year. I hope in saying this you do not for one moment think that in accepting the office of President I do so with any luke-warm feeling towards the Society; it is the very reverse I can assure you. But what I am extremely anxious about is that we should really take the position which we ought to do, and become to our profession something like the British Medical Association. I hope when the time comes to give a helping hand to it. I beg to thank you for the honour you have conferred upon me.

The PRESIDENT: We have now to elect the Vice-Presidents. Six gentlemen have been nominated by the Council for your approval.

Mr. MALCOLM: The gentlemen nominated for Vice-Presidents are:—Mr. T. Campbell, or Kirkcudbright; Mr. Alexander Pottie, of Paisley; Mr. J. Bell, of Carlisle; Mr. J. Burnett, of Maybole: Mr. C. Cunningham, of Slateford: and Mr. G. Elphick, of Newcastle-on-Tyne.

Captain RUSSELL: I propose that this be adopted: I do not think if you look through the country that you will find six better men.

Mr. J. McGAVIN seconded the motion, which was agreed to.

Mr. MALCOLM: The members of Council nominated are:—Mr. J. Armstrong, of Penrith; Mr. J. Donald, of Wigton; Mr. J. Carlisle, of Carlisle; Professor McFadyean, of Edinburgh; Mr. A. A. Macfarlane, of Greenock; Mr. A. Reid, of Auchtermuchty; Mr. A. Robb, of Glasgow; Mr. J. Weir, of Glasgow; Mr. Finlay Dun, of Edinburgh; Professor W. O. Williams; Mr. H. Thompson, of Aspatria; Mr. J. Clarke, of Cupar.

On the motion of Mr. Bell, seconded by Mr. W. Anderson, these gentlemen were elected as members of Council.

The PRESIDENT: We have now to elect the Treasurer and Secretary.

Dr. FLEMING: In proposing Mr. Wragg for re-election as Treasurer, I may say I think our financial position is in a very fair way of being improved, and I am sure we could not trust it to safer hands than those of Mr. Wragg.

Mr. FAULKNER: I beg to second the proposition. Mr. Wragg needs no eulogy from me; his deeds speak for themselves. Wherever he is known I am sure he is appreciated.

The resolution was agreed to.

Prof. WALLEY: I have great pleasure in proposing that our friend Mr. Malcolm be asked to remain in office. I am sure we could not have a better Secretary. Everyone who knows Mr. Malcolm knows that he will do his utmost to further the interests and the objects we have in view. I think we could not have a better man. I propose that our present Secretary be re-elected to the office.

Mr. TOOP: I am very pleased to second that. It was through Mr. Malcolm's influence that I joined the Association.

Dr. FLEMING: I will support the motion. I think we are exceedingly fortunate in getting Mr. Malcolm to act as Secretary. The position is one involving a great deal of labour. It is a very difficult matter to please everybody, but I think that if any man could succeed in doing so Mr. Malcolm is that man.

The resolution was agreed to.

The PRESIDENT: It will be necessary to appoint a trustee in place of Mr. Banham.

Mr. WRAGG: The money invested in Consols stands in the names of three trustees—Sir Henry Simpson, Mr. Bpnham, and myself.

Mr. A. W. MASON: I shall be very pleased to propose that Mr. Trigger's name be substituted for Mr. Banham's.

Mr. J. ABSON seconded the motion.

The PRESIDENT: The motion is that Mr. Wragg, Sir Henry Simpson, and Mr. Trigger be the trustees to deal with the money of the Association.

The resolution was agreed to.

The PRESIDENT: We now come to the question of location of place of meeting.

On the motion of Prof. WALLEY, seconded by Mr. ANDERSON, Glasgow was selected for next place of meeting.

The PRESIDENT: Now, gentlemen, I think we may deal with the question of original research.

Dr. FLEMING: I think it is highly desirable that the Association should give a reason for its existence, and that reason should be given as soon as possible. It is necessary to entrust the chief portion of this work to a small committee. I therefore propose that a small number of gentlemen, members of this Association, be appointed as an Investigation Committee, with power given them to select the subjects for research, and to select the gentlemen who are to conduct the researches.

Prof. WALLEY: I do not think for one moment it can be thought that I am in any way opposed to this proposition. On the contrary, last year I was one

of the first to bring it forward at the meeting in London; but we must proceed in order, otherwise we shall have someone by and by pulling us by the collar. Rule 41 says that the Council shall have power to form committees, composed ol one or more members of the Association, to consider special subjects and report thereon to the Council. I would like to ask how that rule agrees with the appointment of a committee by the Association? There is nothing in the rules certainly that the Association shall not appoint a committee, but there is no rule which says that the Association shall appoint a committee. The appointment of committees is I think, vested in the Council. If it is, so much the better; if it is not, I am very anxious that this matter should not be postponed. At the same time, we must proceed in order.

Mr. TRIGGER: Is there anything to prevent this matter being referred to the Council to-day?

The PRESIDENT: I think we are quite in order to appoint a committee at a General Meeting.

Mr. MALCOLM: There is nothing in the rules taking away the power of this Meeting to form any committee; they give the Council power to form committees also.

Prof. WALLEY: It would never be put as a rule that committees shall be formed by the Council, if it was intended that the Association might appoint committees.

Dr. FLEMING: To meet that objection I will move that it be an instruction to the Council to appoint a committee. I am certain that this Meeting has power to appoint a committee, but to prevent further questioning I am willing to alter my motion in that way, that it be referred to the Council to appoint a committee, the Council to hold a meeting to-morrow morning.

Prof. WALLEY: I will second that motion.

Mr. W. HUNTING: Before we appoint a committee, it will be a great assistance to us in the selection of members of that committee, if we knew what they were going to do. To appoint a committee to do something, nobody knows what, might lead to very serious difficulties. We might appoint a man whose knowledge of animals was confined to the horse, to look after some cow pathology, or *vice versa*. You will see without my illustrating it, the variety of difficulties you would get into by appointing a committee to do nobody knows what. What has been suggested is that this Society should do something, and one reason given for the something, as I understood it, was that we might possibly be able to spend some of the funds, about £150, instead of leaving it in the treasury. That is open to question, whether that is good business or not. Anyhow it is only common sense to say what we shall do, before we go any further. What shall we appoint a committee for? What shall we give a man money for? Whom shall we select? When you talk about original research, what do you mean, clinical observation, or the use of the microscope? because there are men who use microscopes. that we had far better give the whole £150 to let it alone for the rest of their lives. Perhaps pathology has been done as much harm to by the microscope during the last ten years, as by anything that was ever applied to it. I hope we shall not rush into any such tolly—that is the only word, folly—as to appoint a committee to carry out something, and especially if it is going to do bacteriological work. You will see at once it is necessary for us to distinguish between bacteriological work and clinical work, before we can select committees, because, supposing you put me on a committee and it was bacteriological work, really it would be a very useless expenditure of money. That is all I can say, and it might be suggested to the meeting that a very much better way of using money would be that when you see a man who has done some work, and is in the right track to do a little more, you might encourage him for what he has done. Do not throw the money away on any

stupid notion that we are going to appoint a committee to do something, and employ somebody to do it, anyhow and anywhere.

Prof. WALLEY: Any committee appointed by this Council would take into consideration and would be happy to receive suggestions from the Association. I am only anxious that the matter should be done in a proper way, and I think the proposition made by Dr. Fleming meets my objection on that point.

(To be continued.)

ROYAL COLLEGE OF VETERINARY SURGEONS.

Fellowship Degree.—An Examination for the above degree was held in London, on Friday, October 30th, when the following gentlemen were admitted Fellows of the Royal College of Veterinary Surgeons:—A. Peele, Esq., West Hartlepool, Durham; T. J. Harvey, Esq., St. Columb, Cornwall; H. W. Caton, Esq., London, E.; T. H. Merrick, Esq., Northampton. The Examiners were Dr. Fleming, C.B., Professor Duguid, and J. Roalfe Cox, Esq.

Jurisprudence.

PROSECUTION BY THE ROYAL COLLEGE OF VETERINARY SURGEONS.

THIS was a prosecution by the Royal College of Veterinary Surgeons against Henry Cozens, of Slough, shoeing smith, under the 17th section of the Veterinary Surgeons' Act, 1881, for describing himself as a veterinary surgeon, and was heard at the Petty Sessions at Slough on the 21st October, 1891.

In April, 1891, the defendant gave evidenee, on behalf of the Royal Society for the Prevention of Cruelty to Animals, in a prosecution by them at Slough, for cruelty to a horse, and he in the box stated upon oath, in answer to the magistrate's clerk, that he did practise as a "vet."

Mr. COLAM, barrister, appeared for the prosecution, and stated that the College did not press for a heavy penalty, but desired the infliction of such a penalty as would deter others from committing a like offence.

Mr. LOVEGROVE, the magistrate's clerk, produced the depositions, and proved the case.

The defendant was represented by Mr. Smith, solicitor, who, on his behalf, raised objections; first, as to the date when the information was laid, and secondly, as to the form of the summons, both of which were over-ruled by the magistrates.

He then pleaded that the defendant made the statement inadvertently and without thinking of what he was saying, and that if his client was guilty at all he was guilty merely of a technical offence, and he asked the magistrates not to inflict any penalty.

The magistrates consulted together and delivered their judgment, convicting the defendant of the offence.

They stated that they thought the College were quite right in prosecuting, but at the same time they did not believe that the defendant intentionally committed the offence, and therefore they thought that the justice of the case would be met by a fine of 1s. and costs; but such costs were only to be court fees (14s.), as if they made the defendant pay the costs of the prosecution it would be inflicting on him a much heavier penalty than they intended.

They stated that they hoped this would be a warning to defendant and others, and that although the statement made by defendant did not deceive them, as they all knew him, still he had no right to say that he was practising as a vet.

Notes and News.

A PISCINA FOR DOGS.—Stuttgart, in Wurtemberg, is the first town, says *Le Chenil*, in which a piscina for dogs has been installed. The size of the bath is sufficiently large to allow them to swim, and they are attended to by bathmen attached to the establishment.

THE CULINARY CONSUMPTION OF DOGS AT MUNICH.—The French sporting paper, *Chasse et Pêche*, states that the municipality of the Bavarian capital have written to the Berlin authorities, enquiring whether in that city the flesh of dogs is often employed in sausage-making, as at Munich, and if that industry is under any regulation. It appears that, during the summer, there is a large Italian colony in Munich, the members of which are very partial to canine flesh. The reply of the Berlin municipality is to the effect, that nothing is known as to whether the profession of dog-butcher exists in the capital of the German Empire; but if it does, there are certainly no regulations as to the slaughter or consumption of animals belonging to the canine species.

HORSE-SHOERS IN PARIS.—A census of workmen in the department of Seine gives the following results as to the shoers of horses. The patrons or employers of these artizans are master-shoers, veterinary surgeons, large companies, and job-masters. There are in Paris 338 shoeing-forges, of which 178 belong to master-shoers, 68 to veterinary surgeons, 84 to companies—railway, omnibus, etc.—and 8 to job-masters. In these 338 workshops there are 1,179 special workmen—shoers, shoe-makers, and foot-holders *(teneurs de pieds)*. These 1,179 workmen do 12,080 hours work every day, or an average of 10 hours 25 minutes. The ordinary working day is 10 hours, but there are some forges in which it is 11 and 12 hours. The total wages is 7,663 francs, 50 centimes a-day, or an average of 6·50 francs (5s. 5d.) for each workman. The shoer receives 7 francs (5s. 10d.), and the foot-holder 6 francs (5s.). The daily task of the workmen is to forge 30 shoes a-day. The average price of shoeing is 5 francs per horse (4s. 2d.)

SPECTACLES FOR HORSES.—The *Optician* confirms the story, already reported in the Journal, that a well-known firm of opticians in London manufacture specially constructed spectacles to be worn by horses. The object is to promote "high stepping." Horse spectacles, it is said, are made of stiff leather, quite enclosing the eyes of the horse, and the glasses employed are deep concave and large in size. The effect is to give the ground in front of the horse the appearance of being raised; the animal, therefore, steps high, thinking he is going uphill, or has to step over an obstacle in front of him. If the system is persevered with when the animal is young the effect is marvellous. Many horses, it is alleged, could be materially improved by a visit to the optician, and it is recommended that the sight of all horses should be tested. This particularly applies to valuable hunters, which are found optically unfit for their work, when a little artificial assistance would make them as useful as ever. "Apart from this consideration, many vices, it is believed, might be cured by means of eye-glasses. The cause of shying is, as a rule, short sight."

HORSE-FLESH IN SOUTHERN RUSSIA.—It is stated that 9,700 horses have been slaughtered during the last three weeks, in the Government of Riazan, South Russia, for food.

MESMERISING HORSES.—Mr. Ritchie, managing director and chairman of the Royal Aquarium board of directors in London, ever on the alert for something to tickle the popular palate, has put out an exceptionally varied programme, bristling with sensational novelties, foremost among them being an announcement that Signor Peyrani, an animal mesmerist never previously seen in London, would give a marvellously good show by experimenting, without cruelty, on a horse, and reducing the animal, under supposed hypnotic

influence, to absolute subjection. Signor Peyrani, however he managed to bring about the result, apparently with the aid of hypnotic passes, caused an exceptionally spirited and frisky chestnut animal, which was brought upon the stage, to assume the cataleptic state precisely as Professor Germane in another part of the building operates on human beings of his own selection. The horse in question is, in the first instance, placed in sitting posture on a chair at an angle of about 45 deg. After Peyrani proceeds for some few minutes with mysterious manipulation over the equine subject's head, eyeballs, neck, haunches, and back, the animal gradually slides from an upright position, and falling sideways on the stage flooring, remains at first immovable and seemingly helpless. By-and-bye he is rolled over on his back, and the professor causes him to place both his fore and hind legs unsupported in a perpendicular position, to bring the former, without any joint bending, into immediate contiguity with the latter, and to do various other movements which one is accustomed to witness at mesmeric *séances*, where patients of either the male or female sex are operated upon. Many of the horse's actions are identical with what the circus arena has made us familiar, when Ducrow, Astley, Cook, Sanger, and other experts showed to what perfection intelligent horses may be brought, but Peyrani's pupil leaves them far and away behind. It was altogether more or less an interesting performance, and when the animal became released from the mesmeric trance, or whatever was the condition, it seemed none the worse for the ordeal. Certainly there was no cruelty of any kind to be noticed in the professor's mode of treatment. The vast assemblage, which filled every part of the building, were loud and enthusiastic in their applause.

HORSE-SICKNESS IN AFRICA.—It would appear that this scourge of South Africa prevails as far as our pioneers penetrate that great continent, and that it is likely to exert a baneful influence on the extension of colonisation. One of the latest wanderers into our new territories there—Lord Randolph Churchill—in a recent letter, describing the beauty and fertility of an immense tract, says :—"This good country extends from the Lundi to within a few miles of Fort Victoria, a distance of about sixty miles, and is incomparably the best part of Mashonaland which I have yet seen or heard of. No finer tract of land for farms could be found in Africa were it not for two fatal disadvantages—1, the malarial fever, which during the rainy season terribly oppresses human beings; 2, the sickness which at all periods of the year kills from ninety to ninety-five per cent. of horses and mules brought into the country. The opening up of the bush veldt, the cultivation of the soil, and some amount of drainage may overcome the former evil and cause it to disappear, as has been the case in other parts of South Africa; the same causes may diminish the severity of the horse sickness. Till these changes have extensively occurred I am of opinion that agricultural enterprise in this otherwise beautiful part of Africa would be attended with damage, disaster, and catastrophe.

Correspondence.

PROSECUTIONS FOR CRUELTY.

DEAR SIR,—By this post I have sent you a copy of the *North Wales Chronicle*, containing an interesting account of two prosecutions by the Society for the Prevention of Cruelty to Animals. With regard to the first one, the reflection naturally occurs, that, as it is a preventive Society, the Inspector might have taken some active steps to "prevent" the cruelty to the animal in question, instead of looking on and making a case: and with regard to the second, *i.e.*, the use of spurs to the same animal,—the question naturally arises, is every gentleman wearing spurs in the hunting-field, and every military man who spurs his horse at drill, to be summoned? If not, why not?

Does the Society wish to completely tie the hands of the Veterinary profession, and to hinder their stepping in in a case like the one described? For, obviously, had the surgeon remained inactive, he could not have been summoned.

J. POCOCK.

[The first case was published in our last *Journal*. ED. V. J.]

FREEDOM OF OPPORTUNITY A CURE FOR ALL THE ILLS OF THE VETERINARY PROFESSION.

SIR,—It is certainly a commendable spirit which essays to eradicate those evils of the profession which are continually cropping up. Each and every one of them should certainly be cut off from us, killed with one, or if necessary, many-well, directed blows. I am a thorough believer in the Irishman's advice, "wherever you see a head, hit it," if that head is in the wrong place; but as it is possible to err, for even Veterinarians are but human, after all—I would suggest, that before following the Irishman's advice, it would be well, first, to bear in mind Davy Crockett's motto, "be sure you are right—*then*, go ahead!" for no matter how good our intentions may be, if our judgment is wrong, or not absolutely correct, the remedies we propose will never cure, but may, and probably will, add other evils to the list.

I propose in this article to take up a few *recognised* (*?*) evils, and suggest a remedy; a remedy not only for the few evils I will particularize, but for most, if not all the evils which are now prevalent in our midst, or may crop up in the future, *owing to those baneful influences which pollute the source from whence the Veterinary profession is nursed, nourished and fed.*

First, I will speak of Patent Medicines. This is an evil, and recognised as such, by every member of the profession. It is one of the articles of our creed—they who think—that is, think aloud, and different—are heretics, and without mercy put to the torture. Wherever you see a patent medicine head raise its hydra form, decapitate it with a good clean sweeping stroke! show no mercy, listen to no argument! but, "off with his head," and bury it in the dung-heap! So be it! Yet in spite of this fierce, unrelenting opposition, patent medicines are more freely advertised and more freely used than ever. Surely there is some reason for this, some sufficient reason. Let us probe this sore, which so far has resisted our efforts to heal, open it up wide, and see if we cannot make, if not a cure, at least an accurate diagnosis.

By a patent medicine, we mean a secret medicine that is patented. As a profession, we have not the slightest objections to patents, so that our objections are confined to the secrecy of the drugs. We object to secret medicines, because their dangerous properties are unknown. But secrecy seems to have a peculiar charm for a certain class of the public; in each and every instance, however, that this charm holds sway, its hold sways on account of ignorance. A well educated physician, and a believer in a secret remedy (without a thorough trial), are thoroughly incompatible; if every man in the world were as learned in medical matters, as a physician should be, secret remedies would receive a blow that all the printers' ink in Christendom could not cure. Of course, to have the world so educated is out of the question, and "a little learning is a dangerous thing," and simply advances the public to the ignorant use of drugs which are *not* secret, the latter in all probability more deleterious than the former. The framer of a patent medicine has to work around a great many points to make a success; it must cure a sufficient number of diseases to make its field of *usefulness* (*?*) large enough to procure a large sale. He takes particular note of symptoms as they are apt to present themselves to the ordinary individual, convenience and ease of administering, advertises freely, and last, but greatest of all, he must *bring its price within the means of all*, and this last is the real secret of the immense sale of patent medicine. The public are poor; they recognize they need something to cure them; they cannot

afford to pay a physician, or a veterinary surgeon. The American people want cheapness, so do the English, so do the people of every nationality, and it is a *fact*, a horrible, miserable fact, that owing to the poverty of the masses, they are obliged to economize even in matters which appertain to their health, *and if we would remove this crying evil of patent medicines, we must first remove poverty from the earth, or else supply the masses with a substitute which will be within their means.* We can cry out against it as loud, and as long as we please, we can damn it as low down in Hades as imagination can carry us, but while the people are crying for bread, or obliged to economize in the necessaries of life in order to lay by for a rainy day, while the struggle for independence is as fierce as it is, so long will we be listened to with deaf ears; so long will our condemnation be unheeded.

"Penny Colleges,"—colleges having one, or mayhap two, veterinary professors—comprise another evil we are hearing more of to-day than formerly, and as each one pops up its head, down comes the club on its unfortunate cranium. We are almost a unit in condemning them. "I cannot see that they have done harm," is the most favourable remark I have ever heard, and that was uttered by Dr. Peters, of Boston, at the last meeting of U. S. Veterinary Society; yet, notwithstanding such a general condemnation they are undoubtedly very good signs, very good things. No matter how poorly they are equipped for the purpose of teaching veterinary science, yet they do teach it—poorly, inadequately, I admit, but even this is better than blank ignorance. The people want a veterinary surgeon, and even a poor one is better than none. I am in favor of the very highest veterinary education. So is everyone. I am in favor of the very highest education in every branch of learning, but for that reason, would I do away with our public schools, burn to the ground our little village school house, or would you Englishmen kill your Free Education Bill? By no means; one does not interfere with the other. Everyone, except the lazy man, desires to be well educated on some subject; certainly he whose inclination turns to veterinary matters, who desires to make it his profession in life, must naturally be desirous of being thoroughly equipped in his calling. But it does often happen that he is too poor to travel a hundred or a thousand miles, where the best opportunities exist, and rather than give up his desires, he accepts the best substitute he can afford. If you condemn him for doing this, you must condemn professors Dick Spooner, Youatt, etc., etc., and about all the old practitioners in the U. S. for not going to Germany or France to graduate, and also condemn the first college in every country. Beginnings are always poor, and our penny colleges are beginnings; are legitimate infants to be nursed and helped, not condemned. They occupy the same place in the profession as secret medicines, druggist's prescriptions, and "every man his own horse doctor" books, do to the public, and the remedy is the same—*to give a better substitute which will come within reach of the aspirant to veterinary honors, or else remove the poverty which prevents the born veterinary surgeon from being a veterinary surgeon, in fact.* "Uniform Veterinary Education" is utterly out of the question under present social conditions. Supposing we had a Central National Veterinary School, it would necessarily be a great number of miles from the periphery of this enormous country; the expense of attending would be considerable—so great indeed, that "none but the wealthy could enjoy," and even then we would have poor veterinarians; for our capacities for learning differ very much, even when the opportunities are equal, but even if there was not this difference in the cranial capacity of Americans, how would we protect the public from the poor foreign veterinarian? bar him out as we do the Chinese? A "Central National Veterinary Institution" would undoubtedly be of immense advantage *to veterinary students*, that is, to those who possessed, or whose *pater familias* possessed, sufficient of the *wherewithal* to allow him to take advantage of it,

just as it is a very good thing now for the individual who can complete his education in the superior English, French or German schools. And if, in America, we could as well only have a few laws passed to guillotine the smaller institutions, and everyone who had not a diploma from the large institution, as they have, we would, without a doubt, after a time of feeding on such rich public fodder, reach the acme of veterinary knowledge, as they have. But of what use are the highest scientific attainments to a man not worth a dollar, or to a horse, which those highest attainments would refuse to treat, except by charity, because the owner was *too poor to pay ?*

A Central National Veterinary School! It does sound nice! and *to be owned by the public!* That sounds even better! But if you analyse it honestly, you will find that all the public own is the expense of equipping, and the expense of carrying it on, while we, as first-class veterinarians, will pile on our fees, and then force that good, free, generous public to pay them, or go elsewhere for veterinary services by taking every opportunity to cut the throats of the inferior fellows, by forcing legislation to annihilate quacks, abolishing penny colleges, preventing anyone practising or using the name veterinary surgeon—in fact, everything that appertains to cheapness (and comes within the poor man's reach), or does not appertain to thoroughness. And this is what we ask the people to do, "for the people's good." This is what we ask Americans to tax themselves for, and in return we give them first-class veterinarians, *which they cannot afford to pay for.* This might answer if the United States had a government of pure modern socialism; if we were a government modelled after Bellamy's ideal; but as long as all (except a favoured few), are dependent on their own efforts, their own brains and energy, it is unjust to expect help for only part of the people, without giving some equivalent to *all* who contribute. They will cry out against it, incoherently perhaps, for the public are not under circumstances to see clearly. It is impossible to look around you, to think on great questions or to act on them intelligently, while your nose is kept down tightly to the grindstone of present pressing necessities; but they will cry out, and later they will kick out, and incoherent public kicking means anarchy.

If we want a Central National Veterinary School, which, as you see, is for our benefit, *first and foremost* we must put our hands in our own pockets, and build it ourselves. If there is a public call for a large corps of peerless veterinary surgeons, let us supply it by all means. "But we cannot afford it, we are too poor," is the cry—and the truth. "Ah! there's the rub!" Poverty comes in again; and surely we should not be poor—the need for veterinary services in this country is enormous, but the fact is, we don't supply it all; a vast deal of it goes into other hands—hands in the shape of patent and other medicines, quacks, handy men, blacksmiths, etc., etc. And yet the people desire the best treatment for their animals, but alas! *like ourselves, they cannot afford to get what they want, and like ourselves they are obliged to put up with the best they can get.*

The point I wish to make clear is, that the evils which are present and continually cropping up in the veterinary profession, are *due to a condition of affairs outside of us*; that we suffer from circumstances *extrinsic* to ourselves, and it we are to remedy them, it is not by combining in veterinary associations to beg legislation in our favor. This is simply an aggravation. We are no better than other people, and it is absurd that we should get laws passed simply for our benefit. A veterinary association's *entire duty* is to exchange individual experience, and thereby promote our *veterinary* knowledge; not to cry aloud for public pap, to beg for government support, and appoint committees on Army Legislation. I cannot imagine anything more hugely ridiculous than sending Uncle Sam word that he is a disgrace to the civilized world, because he has not a corps of graduated veterinarians, nor anything more thoroughly,

humiliating than to be told we were not wanted. When Uncle Sam wants our services, the chances are he will enlist us. We are getting down to a finer and finer point, such little things as individual advertising, objecting even to a letter-head. The poor young fellow, starting in a quiet corner of God's earth, must sit in his office waiting for patrons to come, while the profession gives him the elevating example of "bull dozing" government officials for a job. What is disgraceful in the individual cannot he praiseworthy in the profession. It is no disgrace that our cavalry has not a corps of graduated veterinarians, the disgrace is in the necessity for a cavalry at all. The armies of the world are a disgrace to civilization. And if our troubles are but the natural outcome of troubles in the great world we serve, and of which we are a part, our remedy is to buckle on our armour, go in the ranks, and help fight the good fight, not as veterinarians, but as men, as members of the great brotherhood of man.

The panacea for the evils of the veterinary profession is FREEDOM OF OPPORTUNITY; but freedom of opportunity in the profession is an utter impossibility, unless the world has the same privilege. Opportunities are plentiful enough; God has been liberal enough with His children, but there is no freedom *in gaining access to them*, because they are *owned* (?) by individuals. What the Almighty gave us—earth, sunlight, air, etc., we only own part of, the rest some *favoured few own*, (?) because they have robbed us of our heritage, or received it as a *gift* from someone else who had robbed our forefathers. Sunlight and air we own yet, but the earth "from whence all blessings flow"—how many of us own even a "little bit?" and yet dirt is just as cheap as air or sunlight; dirt is only valuable when we make it valuable by congregating in certain parts of it, and this value that communities give to it, where does it go? To those who *own* (?) it, of course; to a few favoured individuals, and owning the earth is synonymous to owning those on it. If we wish to labor we must *ask permission first*, and then be recompensed, not as we deserve, but as the landowner wishes to rumunerate us. Depending on the recompense the laborer receives, depends indirectly what we will receive as fees.

It is but a natural inference, if opportunities in the world are in the possession of a few, each branch of industry, each profession, will have a similar evil in its midst. So it is with the veterinary profession. The first is the best; veterinary surgeons are the result of inclination, and brains *applied to the freedom of opportunities*. Two men, endowed with equal intelligence, energy and brains, will compare very differently in results in veterinary learning, if one is born and reared in the precincts of the great European schools, and the other on one of our great Western prairies. Again, the eye of the world—the mon-eyed world—is struck immediately by the great centres ot learning, and with the freedom of choice, which only a large pocket-book can permit; they hie themselves to them, rain gold on their sacred roofs, and on those who hold forth in the favored districts. The medical profession forms a better object lesson than we do, for the reason that it has a larger sphere, it deals with greater wealth and greater misery. Some *Professors* make $100,000 each year; many brainy, clever *graduates* in medicine do not earn 100,000 cents. The professors are not one hundred times more intellectual than they who earn one hundred times less, nor are they one hundred times more learned in their business; but their *opportunities* for charging immense fees are one hundred times greater. They, as it were, *own the opportunities*. A man with *extraordinary* ability will forge to the front, and take opportunity by the horns; but a man of very ordinary ability, and to the opportunity born, reaps great rewards; that that simple fact alone gives him. Centres of learning are desirable things, and the bettere quipped they are the better for everyone; but it is decidedly objectionable to build up a great Chinese wall around them,

with the avowed intention of making opportunities to study more and more difficult. Learning should be free, free as air, free as light, free as earth.

From monstrous wealth to the most abject poverty, is the picture all civilization presents, both extremes bringing evil in their train. From fabulous fees to very *very* minute fees, is the picture which the profession (medical) presents. One is the result, and will continue just as long as the other, and if the opportunities for learning ever become so centralized that a number of us are able to tie them up, if we succeed in having only first-class veterinary surgeons, then first-class veterinary surgeons must be satisfied with very small fees in a large number of cases, or else you increase the field for cheaper, *but even more necessary* substitutes: quacks, handy men, farriers, druggists' prescriptions and patent medicines, etc.

The remedy for the ills of the veterinary profession, for the ills of the world, is FREEDOM OF OPPORTUNITY. Freedom to labour on the earth for all mankind, freedom to labour in the field of veterinary learning for *us*. The former will recompense all in proportion to the amount of intelligence and industry applied to nature's gifts; the latter, by giving all of us an equal show, will bring the best of us to the fore. The lazy man, the drone—will get nothing, not as now, the lion's share of charity, so enormous in amount that if properly applied, *all the respectable poor* (what sarcasm!) could be supported in comfort. That everyone should be rewarded in proportion to the quality and quantity of his work, is simply stating a truism, a self-evident fact, whose basis is *justice*, and when *justice* holds sway on the earth, then, and not till then, will the veterinary profession reach its maximum state of usefulness. Then, and not till then, shall we be able to gather in our field of activity *all the born veterinarians*; then and not till then shall *all born veterinarians* be under circumstances which will give the greatest and most thorough scope for their labors; then, and not till then, will quacks, farriers, blacksmiths, patent medicines, druggists' prescriptions, poor veterinary works, etc., decline and die, instead of growing stronger every day; for we will gather in the full harvest, we will do all the veterinary work there is to be done, because people will be able to recompense us at our true worth: the people will be rich enough, and gain riches, or at least comfort, with such ease as to allow leisure enough to cultivate the intellectual powers, and knowledge is the power which will lead to the proper and best use of all, of everything on earth, *us* among the rest. And again, the quack will find other and more remunerative labour, or he will become a real, genuine, *bona fide* veterinary surgeon! the patent medical man will exert his *sometimes great intellect* in other lines of activity that will pay better, and there will be too many good books for poor ones to tantalize the public with, and druggists will have enough to do in their own business to keep them from attending to ours. The time for this millennium many think is in the distant, far away future, or that it is simply a Utopian dream, never to be realized; but to my mind it is coming as sure as fate, and not so very, very far away either.

JOHN A. M. LAUGHLIN, D.V.S.,
Providence, R.I., U.S.A.

FIRED HOCKS.

DEAR SIR,—A carriage-horse a few days since was sent to me to be examined as to soundness.

I passed him as sound. At the time of my examination the animal had a very long coat. Soon afterwards the clergyman—who was the owner—had him clipped, and noticed then that the horse had been *lightly fired.*

He wrote to me, saying that this would depreciate the animal in *market* value, and asking me, admitting that the hocks—which were the parts fired—were

sound, could he return the horse in consequence of the firing? He had been fired, when a colt, for *supposed* spavins. Perhaps, some one will kindly render me advice. "CLIPPED."

[Firing, of itself, does not—cannot—constitute unsoundness, unless a blemish be so considered. It was the practice or fashion, not many years ago, and may be so still, in some parts of England and Ireland to "fire" the hocks of young horses, in order to keep them sound. If no disease were present, such horses were always passed "sound."—ED. V. J.]

WHO ARE THE DISTINGUISHED VETERINARY SURGEONS?

DEAR SIR,—Is it a fact that there are Veterinary Surgeons who doubt the hereditary nature of that disease of the larynx termed "roaring"?

In some correspondence published in the *Daily Telegraph*, between Mr. Henry Chaplin and Mr. Hume Webster, *re* the return of Ormonde, the latter gentleman writes, "I cannot, from my own knowledge, accept the statement that roaring is hereditary; indeed, we have the direct contrary affirmed by distinguished veterinary surgeons." "SNAFFLE."

NEW VETERINARY TITLES.

DEAR SIR,—In this city there is an "Existing Practitioner" who has, at least, invented a title to show the public that he is properly qualified. This gentleman has affixed to his name, and on his establishment, the formidable array of letters which follow, namely, C.V.S.S.P.C.A. Now, sir, many are at a loss to know the meaning of this qualification. It certainly will give our clients in the country something to ponder on, and, of course, they imagine that to obtain such an array of letters the holder must be an exceptionally clever person.

I believe that this gentleman has recently asked the Society for the Prevention of Cruelty to Animals to have his name added to the list of Honorary Veterinary Surgeons to the Society, of which there were already two, for this purpose. We can easily see what his meaning for this honorary (?) position turned out to be.

Cork, *Nov. 10th*, 1891. "JUSTICIA NON AMICITIA."

"FARRIERS."

DEAR SIR,—We thank you for your note to our letter of last month, and forthwith placed ourselves in communication with the Registrar of the R. C. V. S., and we are informed that our "Act of Parliament" does not prevent anybody using the title "Farrier," and further, that anybody can describe himself as a "Farrier" in any Directory, and cannot be stopped under our Act, unless without an account or bill can be produced, showing the individual has charged for services rendered for the treatment of animal diseases, and styling himself "Farrier" thereon. This latter, however, is not always an easy thing to do, as this class of man usually takes ready-money for services rendered, knowing perfectly well he could not recover in a law court, and most of us are well acquainted with this privilege; so he does not lose very much here.

We maintain—and we shall be glad to know your views on this point—that if a person can style himself "Farrier," or any other term implying that he treats diseased animals with impunity, our Act is absolutely useless to prevent any person practising veterinary medicine under whatever title he choses, except that of "Veterinary Surgeon." Again, can existing practitioners of veterinary surgery be prevented from using the letters E. P. V. S.? and if so, what method should we employ? "TRUTH."

[We can only refer our correspondent to the Act of Parliament, which is perfectly explicit on the point referred to. Clause 17 states, that if any person

who is not on the Register of Veterinary Surgeons, or who does not hold the certificate of the Highland and Agricultural Society of Scotland, "takes or uses the title of Veterinary Surgeon or Veterinary Practitioner, *or any name, title, addition or description, stating that he is a veterinary surgeon or a practitioner of veterinary surgery, or of any branch thereof, or is specially qualified to practise the same,* he shall be liable to a fine not exceeding twenty pounds."

And also it is stated that from and after the date of the passing of the Act, "a person other than as in this section mentioned, shall not be entitled to recover in any Court any fee or charge for performing any veterinary operation, or for giving any veterinary attendance or advice, or for acting in any manner as a veterinary surgeon or veterinary practitioner, or for practising in any case veterinary surgery or any branch thereof."

We cannot see what more could be desired; and conviction will certainly follow infringement of the law, provided that sufficient proof be offered that it has been infringed. It would be a bad day for this country if conviction for any offence occurred without adequate proof. It is for the members of the veterinary profession to see that the Act is enforced against offenders, and to assist in obtaining the necessary evidence. The profession is as well protected in this respect as any other, and certainly much better than some.—ED. V. J.]

THE HORSE'S FOOT.

SIR,—I beg to ask a question which a number of the readers of this valuable Journal may think a very easily answered one, but which I think is more difficult to answer than it may at first appear.

The question is—Does the horse's foot expand or contract as it reaches the ground, and is raised from it; or how does it behave?

The reason I ask it is that I have never seen it satisfactorily explained with any certainty, whether it expands or contracts; and I think it is the first thing a veterinary surgeon and shoeing-smith should study and know before attempting to shoe a horse, as it is the first principle to guide him how he should fit on the shoe. Hoping to have from some of the readers of this Journal an answer,

"ENQUIRER."

[Probably some of our readers, who have devoted attention to this subject, will comply with "Enquirer's" request. So far as our own experience goes, we long ago came to the conclusion that the hoof neither expands nor contracts at its lower margin when the horse places its weight upon it. The dilatation and contraction occur where the elastic apparatus of the foot is placed, and is chiefly noticed at the upper region, towards the posterior parts more especially. Not that the lower part of the hoof is absolutely immovable, but its movements are limited by the wings of the *os pedis*, which are certainly not elastic, and to these the wall is firmly attached, both on their outer and inner surface. This anatomical feature should have settled the question a century ago, had people considered the entire foot instead of only the hoof.—ED. V. J.]

THE CHARGE OF CRUELTY AGAINST A VETERINARY SURGEON AT LLANDUDNO.

DEAR SIR,—The animadversions made on the above case in the *Veterinary Record* of October 31st are obviously penned by someone who cannot restrain his disappointment and vexation at the result of the trial. It would seem that spite and unreason are struggling for mastery in his excited and ill-regulated mind. The truth is, the case was most carefully and patiently considered by the magistrates, and the decision arrived at was just the conscientious conviction of nine-tenths of the persons in that crowded Court. The prosecution in this case made just the same mistake that it constantly makes, viz., it tried to prove too much and over-did it. It is not beyond exceeding

the truth. The magistrates saw it, and nine-tenths of the persons in the Court saw it. To such an extent was this carried that the prosecuting solicitor felt compelled to say he disbelieved his own witness, and that such witness should be turned out of the Court; and the Chairman on the Bench said, "I do not believe him a bit." A great attempt was made to show that a penknife was used, and to fix the time the mare took in dying; some said three-quarters of an hour, others said 55 minutes. These statements were in keeping with the rest of their exaggerations. They were disproved by most reliable evidence, and it was shown that, from the commencement of the operation to her death did not occupy half the time stated, and further that a penknife was never used at all, but the proper instrument for the performance of such an operation.

It must be remembered this mare broke her leg in the race-field, some distance from the town. There was no getting a shot-gun, no pole-axe, no butcher's knife, no knacker. Mr. Booth was requested by the owner to destroy her. Had he divided the carotid artery and jugular vein while the mare was standing up it is admitted on all hands she would have died in less than half the time, the blood-pressure upon the brain would be removed in much less time, and fatal syncope be the result. But, under the circumstances, Mr. Booth was fully justified in casting the mare for the safety of the crowd. There was a most excited, dense crowd of two to three thousand persons, all pressing close upon the mare. Had he operated upon her standing up, she would, doubtless, have plunged about amongst the crowd, covering them with blood, and, in all human probability, would have fallen, head-first, among and upon them, causing serious, if not fatal injuries. The method he adopted was by far the safest and best, and though occupying a longer period, it was not necessarily a painful death.

THOMAS GREAVES, F.R.C.V.S.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from T. B. Goodall, Christchurch; J. MacGavin, Montgomery; Professor Williams, Edinburgh; J. Mills, Bombay; J. A. McLaughlin, Providence, U.S.A.; G. Thatcher, London; Professor McCall, Glasgow; E. E. Bennett, A.V.D., Newcastle-on-Tyne; D. Pallin, A.V.D., Lucknow, India; G. A. Banham, Cambridge; R. Dawson, Weston-super-Mare; "Truth;" J. D. Pottie, Glasgow; H. G. Rogers, London; "Enquirer;" "Justitia non Amicitia;" A. W. Hill, London; P. R. Gordon, Queensland; "Clipped;" "Snaffle;" W. Penhale, Barnstaple; T. Greaves, Manchester.

BOOKS AND PAMPHLETS: *Railliet*, Les Parasites de Nos Animaux Domestiques; *B. Bang*, Ueber Rothlauf-Endocarditis bei Schweinon; *M. G. Neumann*, Contribution a l'Etude des Ricinidæ; *F. Smith*, Saddles and Saddlery, Bits and Bitting; *J. B. Piot*, La Bronchiti Vermineuse Epizootique du Chameau; *A. Revel*, Le Rouget du Porc et son Traitment; Procès-Verbal de l Academie Royale de Medecine de Belgique.

JOURNALS, ETC.: *Repertorium der Thierheilkunde; American Veterinary Review; Recueil de Médecine Vétérinaire; Journal of Comparative Medicine and Veterinary Archives; Boletin Medico de Puebla; Revue Veterinaire; Clinica Veterinaria; Journal de Medecine Vétérinaire et de Zootechnie; Echo Vétérinaire; Deutsche Zeitschrift für Thiermedicin; Annales de Medecine Vétérinaire; Bacteriological World; Thierarzt; Archiv. für Wisseusch u. Praktish. Thierheilkunde; Lancet; British Medical Journal; Edinburgh Medical Journal; Live Stock Journal; Mark Lane Express.*

NEWSPAPERS: *St. Pancras Guardian; North British Agriculturist; North Wales Chronicle; Times of India; Baltimore Weekly Sun; Maidenhead Advertiser; St. Pancras Gazette.*